The RUBBER AGE

October 1943

PUBLIC LIBRARY
OCT 26 1943

REOGEN

REOGEN is used to good advantage in GR-S to improve mixing, calendering and tubing.

Try 5 to 10 parts on the rubber in straight GR-S stocks or in GR-S—Reclaim combinations.

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

R v.54 01943-Mr.1944

Newsletter No. 10
OCTOBER, 1943

Published by Rubber Chemicals Division of DUPONT

CONVERT TO NEOPRENE LATEX NOW

YOUR major problem today is that of converting your production from natural rubber to some other elastomer. In the latex field the choice of an elastomer emulsion is limited by the special equipment available for handling latex and the particular requirements of most of the products which are to be made. Neoprene latex possesses all of the necessary qualifications to replace natural rubber latex and in addition, imparts to the finished product those improved properties for which neoprene is noted.

With slight variations in compounding and manufacturing technique, Neoprene Latex Type 571, the general purpose neoprene latex, may be adopted for practically any articles that have been made in the past from natural rubber latex. Neoprene latex compounds perform satisfactorily in all of the customary processes used for manufacturing articles from natural rubber latex; typical methods of processing neoprene latex include straight and coagulant dipping, gelation molding, spraying, coating, impregnating, whipping into foam sponge and extruding for thread.

Most manufacturers of latex products know the extent to which neoprene latex may be used in dipped goods to produce products of excellent quality. Production of molded articles from neoprene latex has also received general recognition. A few of the many applications of current interest for neoprene latices are:

ADHESIVES— having widely varying degrees of tackiness and capable of producing high initial and final bonds may be produced from Neoprene Latex Type 571. The use of chemical plasticizers and tackifiers has played an important part in the development of neoprene latex adhesives for a wide variety of services.

COATINGS AND IMPREGNATED PRODUCTS— of wide application are made with neoprene latex. Compounds of different types are employed as binders for aggregates of fibrous materials and as coatings in the manufacture of shock pads, gaskets and many other products. The service rendered is outstanding, particularly where exposed to oils, heat, sunlight, flame and oxidation.

ELASTIC THREAD—may be made from neoprene latex. Neoprene thread has excellent physical properties and may be used to produce elastic webbing and related articles having many advantages over similar rubber products. Outstandingly long life under normal aging conditions and resistance to deterioration in sunlight and in dry cleaning solvents are inherent properties of thread made from either neoprene latex or dry neoprene.

FOAM SPONGE— of excellent quality may be made from Neoprene Latex Type 60 which is a specialty product recommended primarily for this use. In addition to the usual chemical and flame resistant advantages inherent in all neoprene products, laboratory tests indicate that neoprene foam sponge has an unusually high shock absorbing capacity.

Almost every conceivable type of product has been made from neoprene latex in our laboratory and many of these have been and are being made on a production scale in various plants throughout the country. We shall be very happy to work with you during this critical period and to assist in converting your production to neoprene latex. Bring your latex conversion problems to us. We are sure we can help you.

P.S. Don't forget there is a plus feature in converting from rubber latex to neoprene latex. Not only do vulcanizates from neoprene latex resemble rubber in strength, toughness, resilience and other physical properties but in addition they are inherently resistant to oils, chemicals, heat, flame, sunlight and oxidation—all of which are natural enemies of rubber.

GR-S TIRES The background of service experience being built up by tires made with 2-MT—Accelerator 808 accelerated GR-S stocks confirms the wisdom of this acceleration choice. If you are not thoroughly satisfied with your GR-S tires, ask us to demonstrate the advantages of 2-MT–808 acceleration.

MECHANICAL GOODS Conversion from natural to synthetic rubber is either an accomplished fact or a "headache" of the immediate future. Neoprene Type GN, or GR-M, has been classified as a general purpose synthetic by the War Production Board. In neoprene you have the best answer to your conversion problems. Ease of processing, excellent molding qualities and inherent tackiness for building operations make it most adaptable. Our field representatives and laboratory staff are available to help solve your conversion problems.

★ *BACK THE ATTACK WITH WAR BONDS* ★

DUPONT

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

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Tech.

First Bounce

HERE a sample of Hycar stock is undergoing tests in the Lupke Resiliometer. The end use of this particular stock requires high resilience, and the indicator shows it's going to have plenty of bounce.

Technical men in the rubber industry are familiar with this rebound test. But they may not be aware of the completeness of the facilities offered to them for developing, testing and perfecting their Hycar stocks at our Customer Service Laboratory.

Here, for the advancement of research and improvement of products, is a complete, fully equipped, fully staffed laboratory devoted entirely to customer problems. We will welcome the opportunity of cooperating with you. *Hycar Chemical Company, Akron 8, Ohio.*

Hycar

LARGEST PRIVATE PRODUCER OF BUTADIENE *Synthetic Rubber* IN AMERICA

LIMITED QUANTITIES OF HYCAR **are now available for experimental purposes without WPB allocations. Individual orders may not exceed 25 pounds per month.**

THE SIGN OF THE MOST COMPLETE LINE OF ZINC OXIDES

• The Sign of the most complete range of zinc oxide particle size characteristics — ranging from the colloidal dimensions of Kadox to the relatively coarse Horse Head XX Red-78.

• The Sign of the manufacturer of both "fast" curing and "slow" curing zinc oxides.

• The Sign of zinc oxides made under three different processes—American Process, French Process, Palmerton Process — in order to impart special properties to meet a variety of special rubber requirements.

• The Sign of the manufacturer of special zinc oxides for improved processing.

• The Sign of the largest and best equipped research organization devoted to the study of zinc products.

THE NEW JERSEY ZINC COMPANY

Manufacturers of the Famous Horse Head Zinc Products

Get rid of your **GR-S "CHEMLINS"**

with NAFTOLEN

REG. U. S. PAT. OFFICE

Are "Chemlins", chemical cousins of Gremlins, causing the poor tackiness of your GR-S compounds? Whether or not "Chemlins" are the cause of this deficiency, the use of NAFTOLEN may be the solution to your problem.

Used in proportions of 25% or higher in your formulation, NAFTOLEN produces tacky, easy processing GR-S stocks. Furthermore, the physical properties of the vulcanizates are not appreciably altered by the use of large quantities of NAFTOLEN.

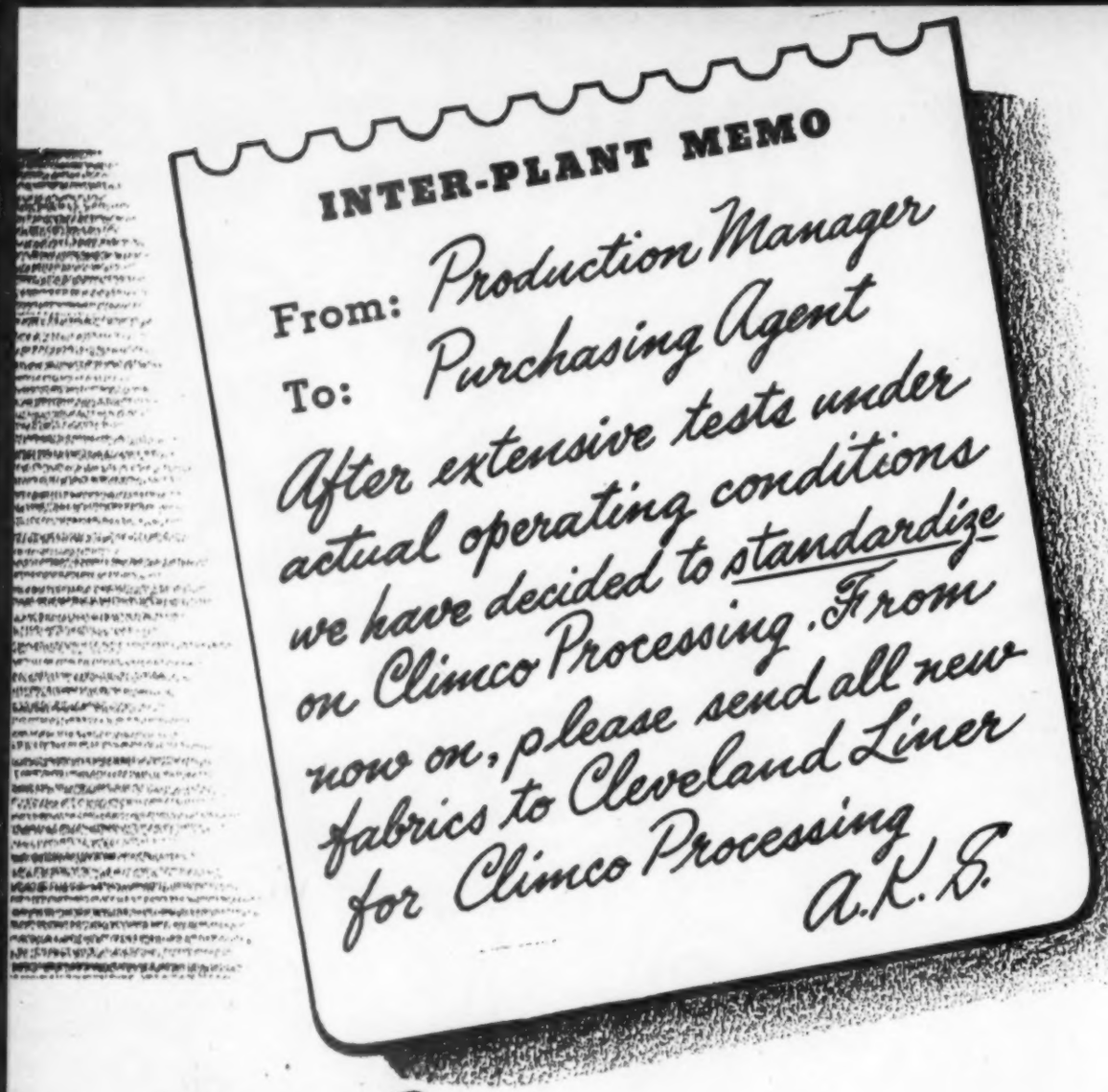
WILMINGTON CHEMICAL CORPORATION

10 East 40th Street — **New York 16, N. Y.**

Plant and Laboratory: — *Wilmington, Delaware*

W
-C=C-

REG. U. S. PAT. OFFICE


INTER-PLANT MEMO
From: Production Manager
To: Purchasing Agent
After extensive tests under actual operating conditions we have decided to standardize on Climco Processing. From now on, please send all new fabrics to Cleveland Liner for Climco Processing
A.K.E.

IT PAYS TO *Standardize* ON CLIMCO PROCESSING

★ In the past 20 years more and more leading rubber companies have standardized on Climco because they have found it soon repays its cost. This tough, yet flexible glaze applied to the liner insures quick, uniform separation, and prevents stock adhesions. Climco Processing also preserves the desired tackiness of the stock, maintains accurate gauge and frees you of the worry of lint and ravelings.

By reducing rejects, Climco Processing prevents the loss of rubber in its crude form. It also greatly lengthens the life of the liner.

Give Climco Processing a trial in *your* plant under *your* operating conditions, and you will soon decide to standardize on Climco.

THE CLEVELAND LINER & MFG. CO.
CLEVELAND, OHIO

LINERETTE
INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

CLIMCO PROCESSED LINERS

FOR FASTER, BETTER PRODUCTION AT LOWER COST

Introducing—

Bunatak*

*TRADE MARK, MALREX CHEMICAL CO.

PLASTICIZERS and TACKIFIERS For GR-S Compounds

After many months of research we have developed a complete line of Plasticizers and Tackifiers to fill the needs of the rubber industry for milling and processing GR-S rubber.

These materials, called the BUNATAKS, are available in various types to meet all requirements and can be effectively used in percentages up to 30% on the GR-S as against the usual 50% to 100%.

BUNATAK Plasticizers and Tackifiers have excellent dispersing qualities, softness, varying degrees of building tack, abrasion resistance and produce rubber-like snappy cured stocks of high physical properties. They have performed excellently under practical plant production and are being used in quantity in the compounding of GR-S for footwear and molded goods.

We invite inquiries on any special problems which you may encounter in the compounding and processing of GR-S.

★

CHART SHOWING COMPARATIVE PROPERTIES OF BUNATAKS

BUNATAK	Specific Gravity 15.5° C	Loss at 105° C —16 hrs	Acid Value	Ash	Iodine Value	Color	Nature of Material	Properties	Tack
X	1.013	1.62%	1.06	0.21%	38	Light Brown	Viscous Liquid	Plasticizer Tackifier	High
F	0.944	3.35%	4.35	3.60%	36	Black	Viscous Liquid	Plasticizer Tackifier	Low
J = T	1.008	3.40%	8.33	0.66%	117	Light Brown	Viscous Liquid	Plasticizer Tackifier	Low
U	0.976	4.80%	1.41	0.15%	45	Light Brown	Viscous Liquid	Plasticizer Tackifier	Medium
O	0.928	3.88%	4.04	0.01%	58	Light Brown	Thin Liquid	Plasticizer	None
R	0.935	9.93%	2.80	Nil	42	Light Brown	Thin Liquid	Plasticizer	None
No. 1	0.965	0.96%	0.74	0.27%	38	Yellow Brown	Heavy Soft Paste	Plasticizer Tackifier	High
No. 5	0.948	5.63%	5.03	2.63%	39	Brown	Viscous Liquid	Plasticizer	Medium
A	0.940	2.36%	4.03	6.66%	38	Black	Heavy Soft Paste	Plasticizer Tackifier	Medium

MALREX CHEMICAL COMPANY
MALDEN, MASS.

DEFERRED!

. . . So the Banbury couldn't do its duty

SPARE PARTS URGENTLY NEEDED!

Do you have spare Banbury parts? You can help someone else by letting us buy them. They are urgently needed.

So much depends upon your Banburys now. Their duty is to the fulfilment of a vital National need. Theirs is a battle-front that calls for the maintenance of the highest production levels in history. Each Banbury must be working at maximum efficiency to assure necessary speed in Synthetic compounding . . . Interstate Service will keep your Banburys off the "deferred" list . . . Its redesigning and rebuilding skill will restore them quickly to full production capacity . . . It will give them the stamina they need to meet tougher compounding schedules with assurance of continuous trouble-free performance for a long, long time. Write, wire or phone us now if you have a Banbury that shows signs of *letting down.*

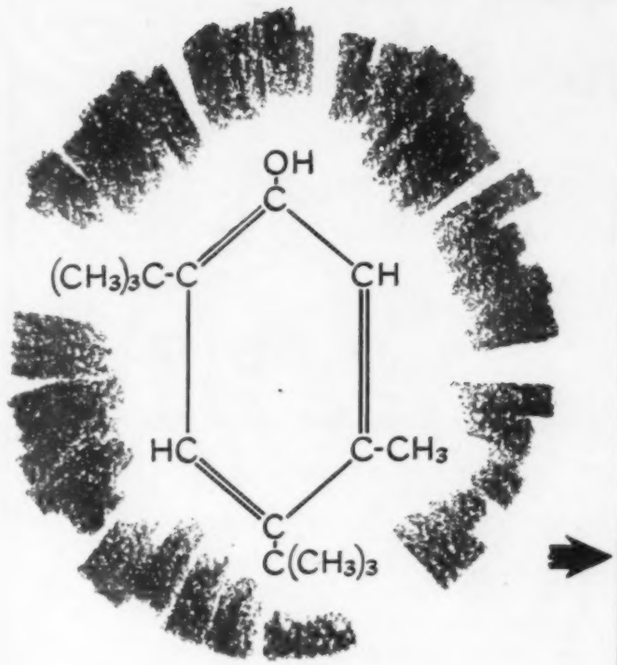
SERVING THE IWS RUBBER INDUSTRY

INTERSTATE WELDING SERVICE

Main Plant: 914 Miami Street . . . AKRON, OHIO . . . Phone: JE 7970

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

KOPPERS D. B. M.



4, 6-Di-tertiary-BUTYL-m-CRESOL

Properties: *(Pure Compound)*

Molecular Weight	220
Melting Point	62.5°C.
Boiling Point:	
At 100 mm. (approximate)	171°C.
Atmospheric (approximate)	285°C.
Specific Gravity at 50/50°F	0.920

State: Light-colored semi-solid, crystalline, mild odor.

Solubility: Practically insoluble in water. Easily soluble in alcohol, benzene, gasoline and carbon tetrachloride. Insoluble in caustic alkali solutions.

Uses: In compounding certain types of synthetic rubber, as a softener and plasticizing agent, and to improve tack. In the manufacture of resins, particularly because of its oil-solubility. It has been suggested for use as an anti-skinning agent for paints and varnishes.

Koppers will be glad to submit samples and prices on this and other coal derivatives, including tar bases, naphthalene, industrial pitches and creosote.

Koppers also supplies to the chemical industry: Coal for steam and for processing. Coke for metallurgical use and for heating. Coal processing systems. Gas plants. Gas purification systems. Gas holders. Valves. Time cycle controls. Anti-corrosive alloys. Fast's self-aligning couplings. Piston rings for compressors, pumps, and steam and diesel engines. Pressure-treated timber for damp and humid locations. Coal tar roofing, waterproofing, dampproofing, industrial pitches.—Koppers Company and Affiliates, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

Efficiency and Economy

with

CAPITOL PROCESS LINER TREATMENT

Plant operation becomes more efficient when you use Capitol Process Treated Liners, making them repellent to rubber stocks, thus enabling operators to handle stocks quickly and effectively. Further, stocks taken from storage can be rapidly separated as needed.

Our Capitol Treatment is economical because such liners can be used considerably longer than those not treated. This means that purchases of cotton piece goods will not need to be made as frequently and we believe you will find that a Capitol Processed liner will, over a period of time, literally "pay for itself."

We are always at your service and orders or inquiries will receive our prompt attention.

TEXTILE PROOFERS, INC.

181-193 Culver Ave., Jersey City, N. J.

Originators of the Capitol Process Liner Treatment

The tail of a comet that reaches back to a Vision

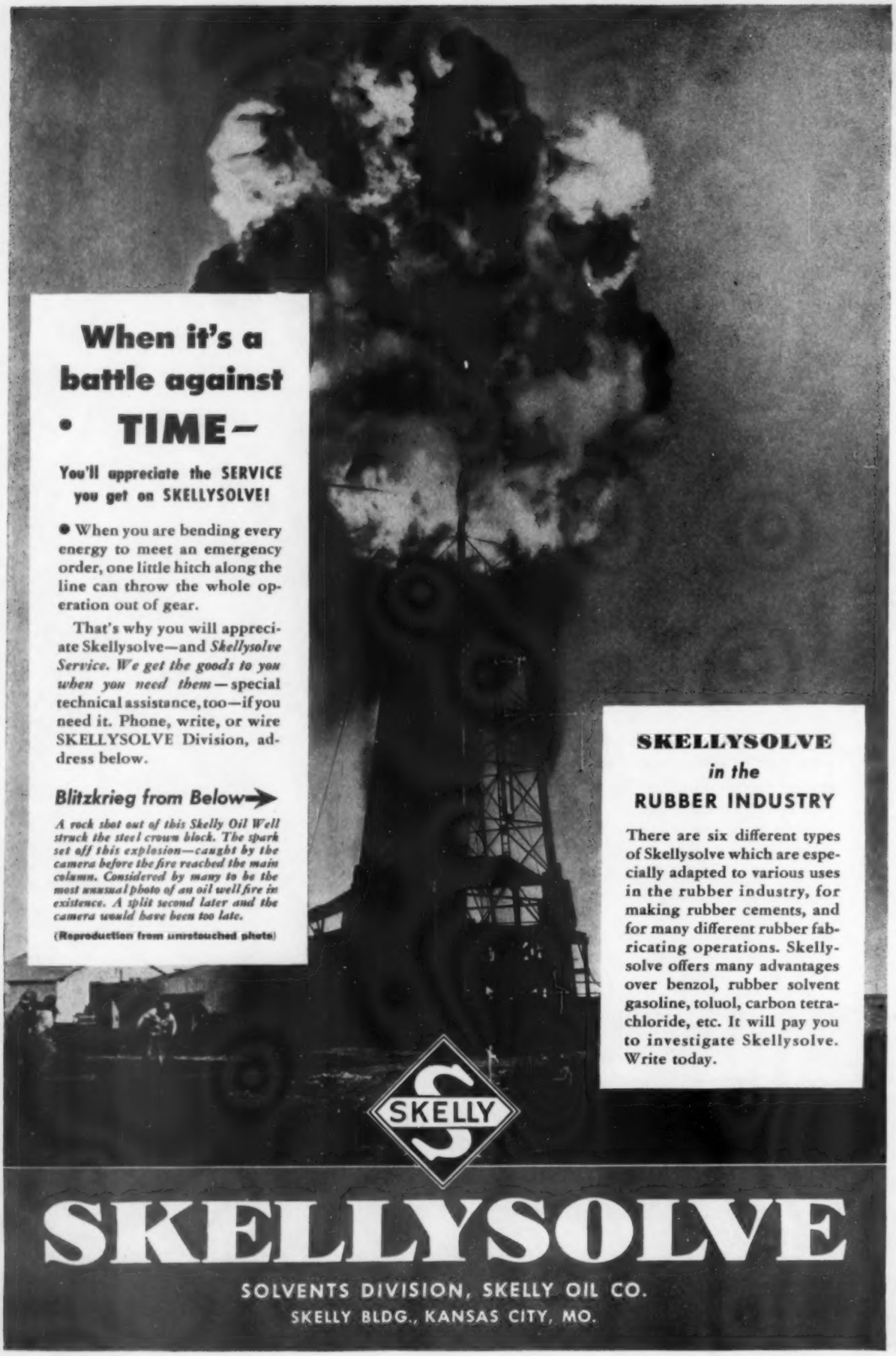
Production of Synthetic goods is like a comet growing more real, ever larger as it approaches . . . But that "comet" has a tail that reaches back to the vision, the plans, the preparations of research engineers, of organizations, of factories. The substance for today's Synthetic processing owes its reality to vision—the ability to see ahead, to anticipate shortages of critical materials and develop equally efficient materials from more plentiful substitutes, to have the faith and courage to go ahead with factory changes and expand facilities for meeting every need . . . Today Para Coumarone Indene Resins, Plasticizers, Dispersing Oils, Softening Oils are ready in any quantity to give speed to Synthetic goods production—as well as to produce more satisfactory results. Tell us your requirements; we will tell you how quickly we can meet them.

These Products are manufactured by Pennsylvania Industrial Chemical Corp.

STANDARD

Chemical Company

AKRON SAVINGS AND LOAN BLDG. AKRON, OHIO



When it's a battle against • TIME—

You'll appreciate the SERVICE you get on SKELLYSOLVE!

● When you are bending every energy to meet an emergency order, one little hitch along the line can throw the whole operation out of gear.

That's why you will appreciate Skellysolve—and *Skellysolve Service. We get the goods to you when you need them*—special technical assistance, too—if you need it. Phone, write, or wire SKELLYSOLVE Division, address below.

Blitzkrieg from Below

A rock shot out of this Skelly Oil Well struck the steel crown block. The spark set off this explosion—caught by the camera before the fire reached the main column. Considered by many to be the most unusual photo of an oil well fire in existence. A split second later and the camera would have been too late.

(Reproduction from untouched photo)

SKELLYSOLVE *in the* RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.

RCI plasticizers give synthetic rubber versatility

RCI products and service offer synthetic rubber manufacturers valuable and practical aid in solving their manifold problems.

RCI, for example, is a volume producer of three different plasticizers for rendering synthetic rubbers resistant to oil, aromatic and aliphatic solvents—dibutyl phthalate, dibutyl sebacate and RC-103 Plasticizer. These three permit a considerable variation in production costs and a wide choice of properties.

In addition, RCI offers customers the active aid of a research personnel with broad experience in the synthetic rubber and related fields.

Write direct to the Sales Department in Detroit for full details on RCI plasticizers and RCI service—a combination which has already done much to add to the versatility and usefulness of many types of synthetic rubber.

ARMY E NAVY

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey
South San Francisco, California • Tuscaloosa, Alabama
Liverpool, England • Sydney, Australia

INDUSTRIAL CHEMICALS • SYNTHETIC RESINS • CHEMURGIC RUBBER • CHEMICAL COLORS • INDUSTRIAL PLASTICS

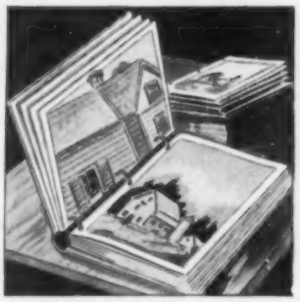
Coated Cloths Made Inflatable, Life-Saving Boats, Rafts and Jackets Possible.

Coated Cloths Filled Gap Between Costly Leather and Flimsy Paper Bookbindings.

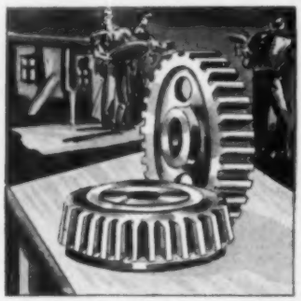
Cloth Gives Fibre Boards Resistance to Abrasion, To Flexing, and to Time.

Cloth Assures Durability For Maps In The Field, On The Wall or In Storage.

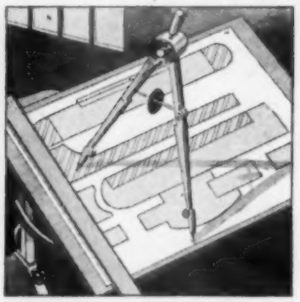
Impregnated Cloths Made Gas Masks Effective: Overcame Quick Deterioration.



Cloth Protects Photos From Crackling and Tearing; Facilitates Placement in Binders.



Cloth Combines With Plastics To Displace Metals In Gears, Gaskets and Washers.



Cloth Protects Original Designs; Assures Lasting Blueprints.

Do You Really Appreciate

THE AMAZING ADAPTABILITY OF CLOTH?

Immediate demands are that weight, time and costs be reduced, products improved, and new products conceived. Cloth is helping to achieve all these objectives.

Think what inflatable boats and rafts of coated cloth, to serve where wooden boats and metal rafts are impossible, mean in saved lives and lessened suffering. Think what is being achieved with cloth and plastic in lamination, with cloth in adhesion.

An accompanying illustration may suggest how something you may have conceived, could be made a reality. The adaptabilities of impregnated, coated and filled cloths seem limitless.

Whatever your conceptions or problems, let us know. Something we already have done, will probably suggest a solution to us, just as these illustrations of some processings may suggest new possibilities to you.

CURRENT HOLLISTON PRODUCTION includes COATED AND IMPREGNATED FABRICS, mildew proof — fire, weather and water resistant — gas impermeable, etc. INSULATING CLOTH BASE — SEPARATOR CLOTHS, rubber, starch-filled, glazed. TRACING AND BLUE PRINT CLOTHS white and blue, ink or pencil. MAP CLOTH. PHOTO CLOTH, self-adhesive. REINFORCING FABRICS. SIGN, LABEL AND TAG CLOTHS, waterproof to take any ink, meet any inking problem. BOOKBINDING CLOTHS. SHADE CLOTH, impregnated waterproof, opaque, translucent or light proof.

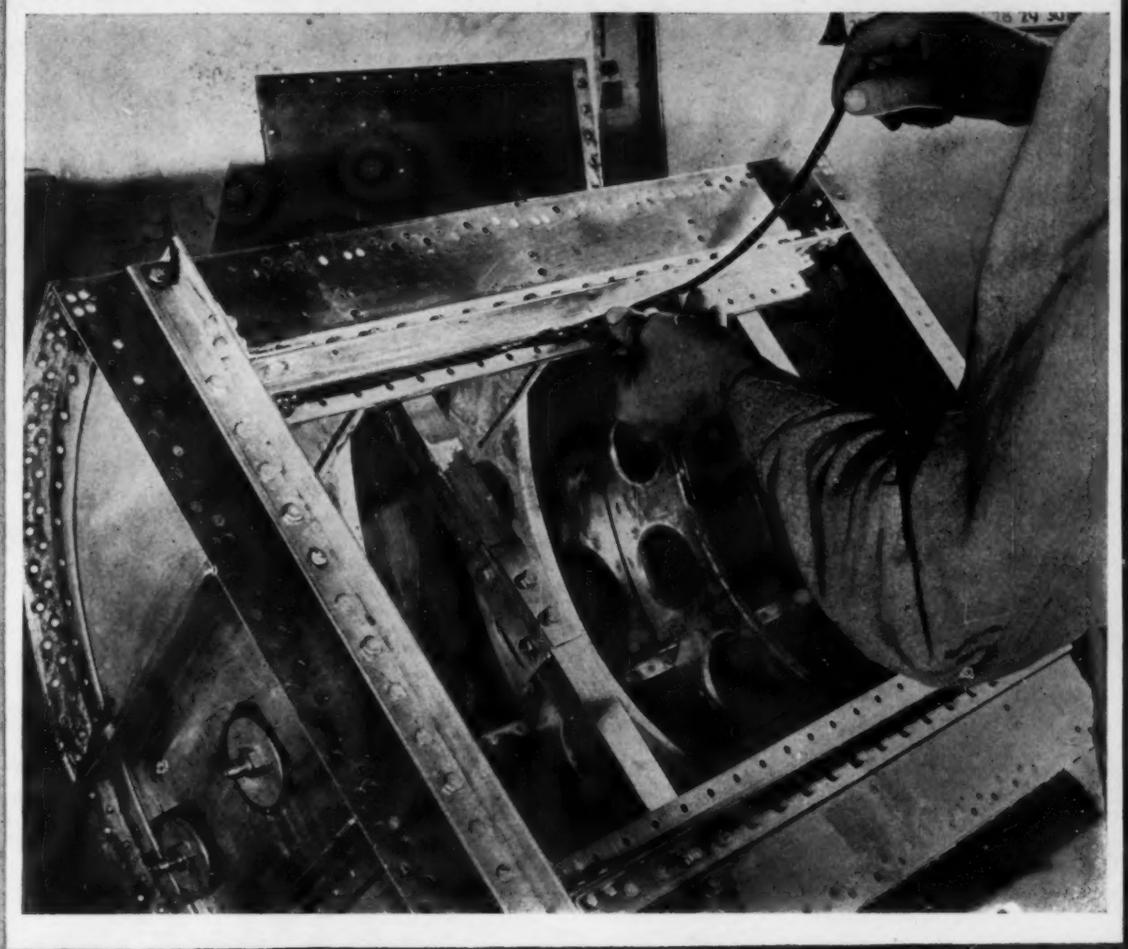
IN DEVELOPMENT: Mildew-proofing and asphalt-impregnating processes; fire and weather-resistant treatments; synthetic resin fillings and coatings applicable from nettings to duck. In general, Holliston can convert any print cloth, sheeting, twill and duck in widths from 30" to 80" and can dye, impregnate, coat and fill in any color to specified stiffness or pliability, hand, bond, weight addition and tensile strength, including Elmendorf tear strength, for any trade, commercial or industrial use. We have both the wish and the capacity to cooperate on production problems. We urge you to consider CLOTH; and invite you to consult with us concerning possibilities and developments for your specific requirements.

THE HOLLISTON MILLS, INC.

CONVERTING CLOTHS TO GREATER USE FIELDS

NORWOOD, MASSACHUSETTS

Sales Agents in Principal Cities



When a tiny crack might cost a plane

IT takes only a few drops of high-octane gasoline mixed with air to form a dangerous explosive. Aluminum airplane gasoline tanks are riveted, leaving the possibility of leaks when the tanks are subjected to severe twists and vibrations in flight. Here was a serious problem for the manufacturer.

Now every inside joint is calked with a special Thiokol* synthetic rubber sealant developed by the Minnesota Mining and Manufacturing Company.

This putty-like material grows firm with age, but never brittle. It is unaffected by oil or gasoline, even aromatic blends . . . maintains its flexible and adhesive qualities indefinitely.

Developed and proved long before the war, Thiokol synthetic rubber is finding wide use in practically every phase of today's battles. Our files are bulging with technical information on hundreds of interesting applications. Much of this material may prove extremely valuable in solving your problems. If you are doing war-work ask us about it.

Thiokol Corporation, Trenton, N. J.

*Thiokol Corporation, Trademark Reg. U. S. Pat. Off.

Thiokol**

SYNTHETIC RUBBER

"America's First"

DETROIT PUBLIC LIBRARY

Servicing

OF

RUBBER RESERVE PERMITS

SYNTHETIC RUBBER

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CRUDE RUBBER

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BALATA

ENTRUST YOUR PERMITS TO US

H. MUEHLSTEIN & Co. INC.

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CHICAGO: 327 So. La Salle St. · AKRON: 250 Jewett St. · LOS ANGELES: 318 W. 9th St. · MEMPHIS: 46 W. Virginia Ave. · BOSTON: 31 St. James Ave.

FOR HEAVY DUTY PERFORMANCE

Continental "A"

THE PROVEN REINFORCEMENT

SEND FOR SAMPLES

ONE OF THESE GRADES IS YOUR BLACK: Continental "AAA" low heat generating, extremely easy processing · Continental "AA" low heat generating, easy processing Continental A medium cure, medium processing · Continental D standard.

FOR HIGH CONDUCTIVITY—Continental R-20, R-30, R-40, and a complete line of color blacks.

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295 MADISON AVENUE · NEW YORK 17, N. Y.

Akron Sales Office: Peoples Bank Building, Akron, Ohio · SALES REPRESENTATIVES: Ernest Jacoby & Co., Boston, Mass. · Marshall Dill, Los Angeles and San Francisco, Calif.

DETROIT PUBLIC LIBRARY

How to improve tensile strength of GR-S

Tests have shown that Bardol* is compatible with GR-S Rubber (Buna S), functioning as a wetting agent and plasticizer to promote dispersion of sulphur and accelerators in the elastomer.

Manufacturers who use Bardol find that it improves behavior and performance of GR-S compounds, providing higher tensile strength and greater elongation.

Bardol, a coal-tar chemical, is also effective in obtaining these properties:

- **Improved resistance to abrasion.**
- **Better flexibility and resistance to ply separation at low temperatures.**
- **Greater resilience and low hysteresis.**
- **Low permanent and compression set.**

For complete details, wire or write

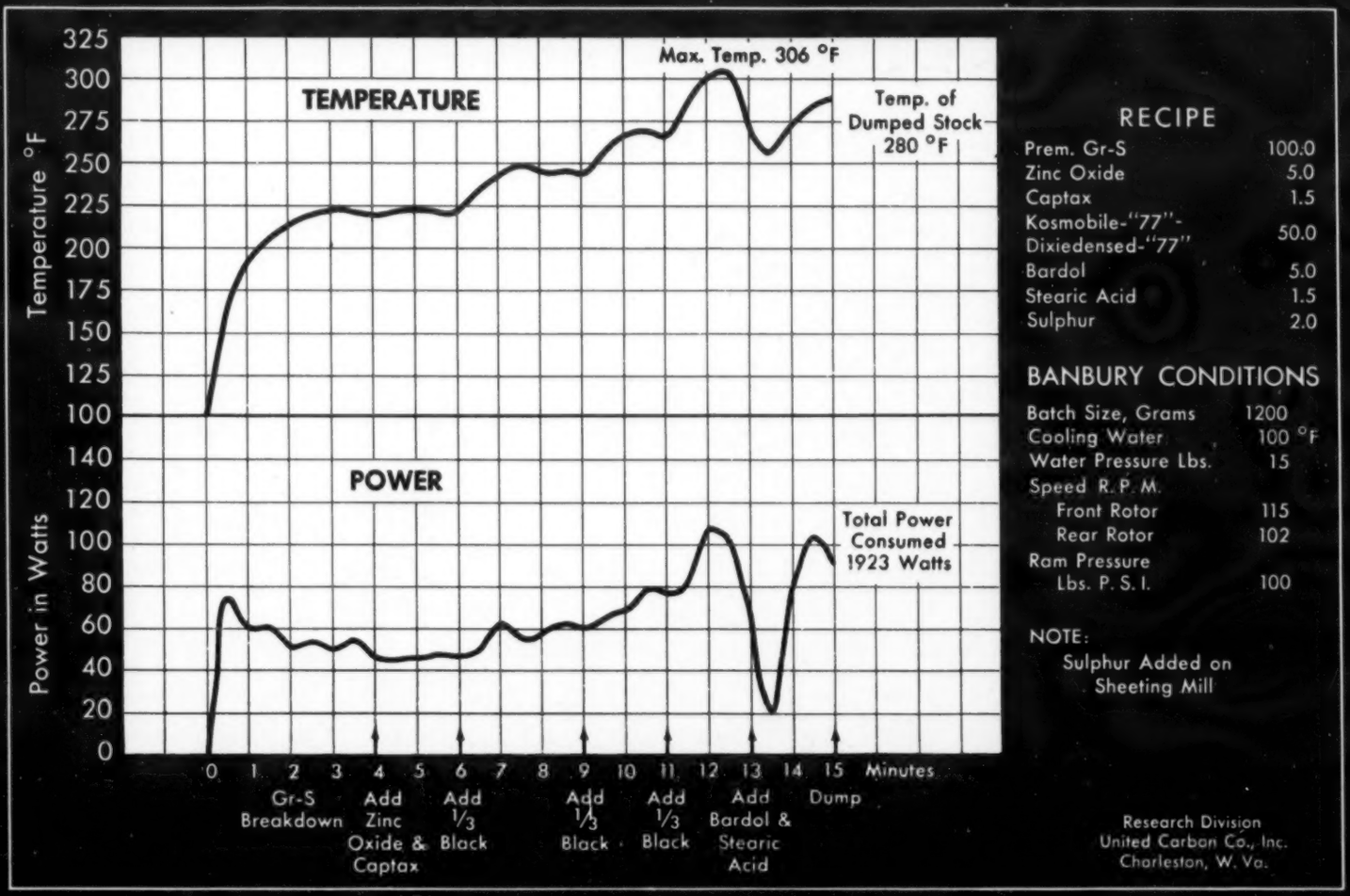
THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

ONE OF AMERICA'S GREAT BASIC BUSINESSES

Barrett

*Reg. U. S. Pat. Off.

BEHAVIOR OF UNITED BLACKS IN GR-S (BUNA-S) TREAD STOCK IN A BANBURY WITH KOSMOBILE 77–DIXIEDENSED 77



RECIPE

Prem. Gr-S	100.0
Zinc Oxide	5.0
Captax	1.5
Kosmobile-"77"-Dixiedensed-"77"	50.0
Bardol	5.0
Stearic Acid	1.5
Sulphur	2.0

BANBURY CONDITIONS

Batch Size, Grams	1200
Cooling Water	100 °F
Water Pressure Lbs.	15
Speed R. P. M.	
Front Rotor	115
Rear Rotor	102
Ram Pressure Lbs. P. S. I.	100

NOTE:
Sulphur Added on Sheeting Mill

Research Division
United Carbon Co., Inc.
Charleston, W. Va.

This graph speaks for itself. The moderate temperature rise and relative low power consumption, observed in this graph, would be even more pronounced where natural rubber is used with Kosmobile 77-Dixiedensed 77.

UNITED CARBON COMPANY, INC.

Charleston, West Virginia

New York • Akron • Chicago

USE UNITED BLACKS FOR BEST RESULTS

Kosmobile 77-Dixiedensed 77 is the dustless easy processing channel black (EPC) for natural and synthetic rubber. Take advantage of its relatively low power consumption and cool mixing, easy and smooth processing, fast curing, top reinforcement, high rebound, low heat build-up, and dependable performance under all sorts of demands.

Kosmobile 77-Dixiedensed 77 is *the* black for tires. Employ it where your cardinal specifications call for toughness, hardness, and resistance to deterioration by generated heat, abrasion, flexing, and cracking.

Kosmobile 77-Dixiedensed 77 is produced under exacting conditions and carefully controlled for quality and uniformity. To repeat, "Use United blacks for best results."

UNITED CARBON COMPANY, INC.

Charleston, West Virginia

New York • Akron • Chicago

For EXTENDING · TACKIFYING · CEMENTING ·

HERE ARE **10** PRACTICAL REASONS FOR USING

PICCOLYTE

THE VERSATILE SYNTHETIC RESIN

1. Similar carbon-hydrogen ratio to rubber
2. Imparts very desirable "tack" to natural rubber, and to certain synthetic rubbers including polybutene and butadiene-styrene types
3. Highly desirable ingredient for rubber cements prepared in solvent form, or in emulsion form for latex types
4. Soluble, in dilute solutions, in light rubber petroleum solvents such as ligroin, pentane, and hexane
5. Does not markedly increase the hardness of the stock
6. It is useful in supplying to synthetic rubbers, a thermo-plastic ingredient similar to the rubber resins in natural rubber
7. Aids breakdown in compounding the GR-S stocks
8. Non-toxic (proved by both animal feeding tests and the poisons analyses)
9. Its hydro-carbon nature means:
   a. Practically no acid or saponification number
   b. Available in various melting points from 10 to 115°C.
   c. Non-yellowing
10. AVAILABLE NOW!

PICCO

PENNSYLVANIA

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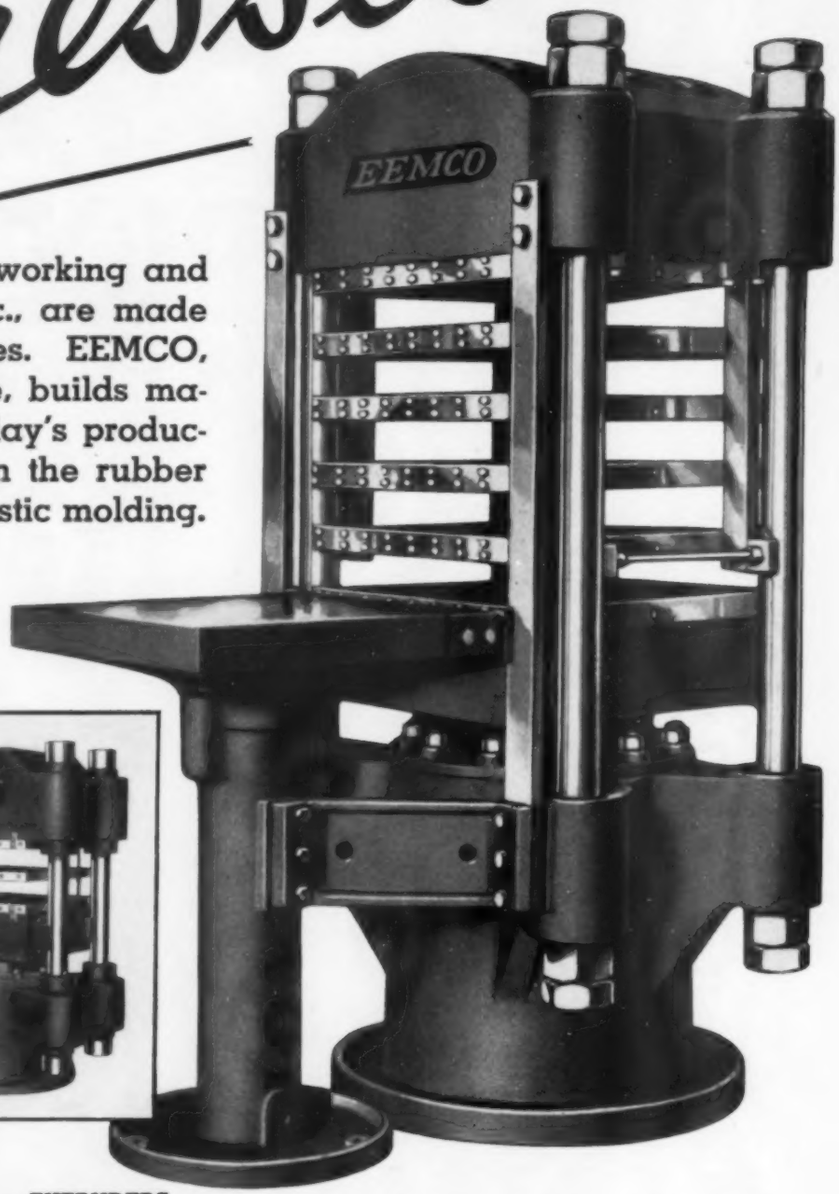

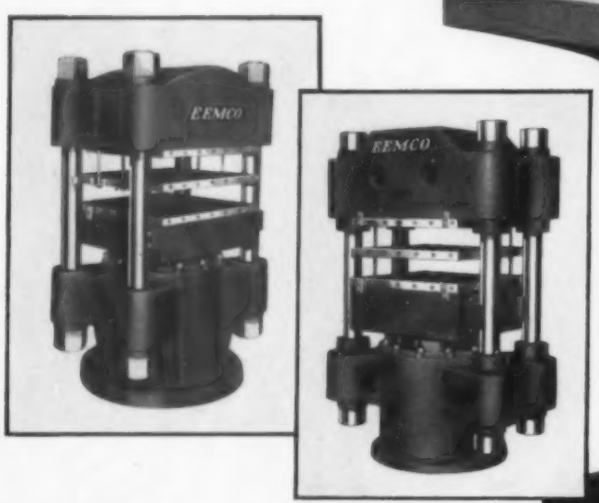

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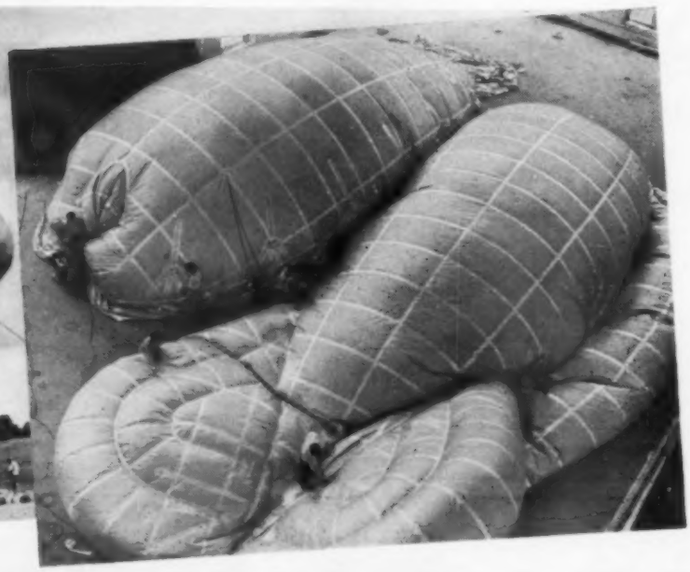

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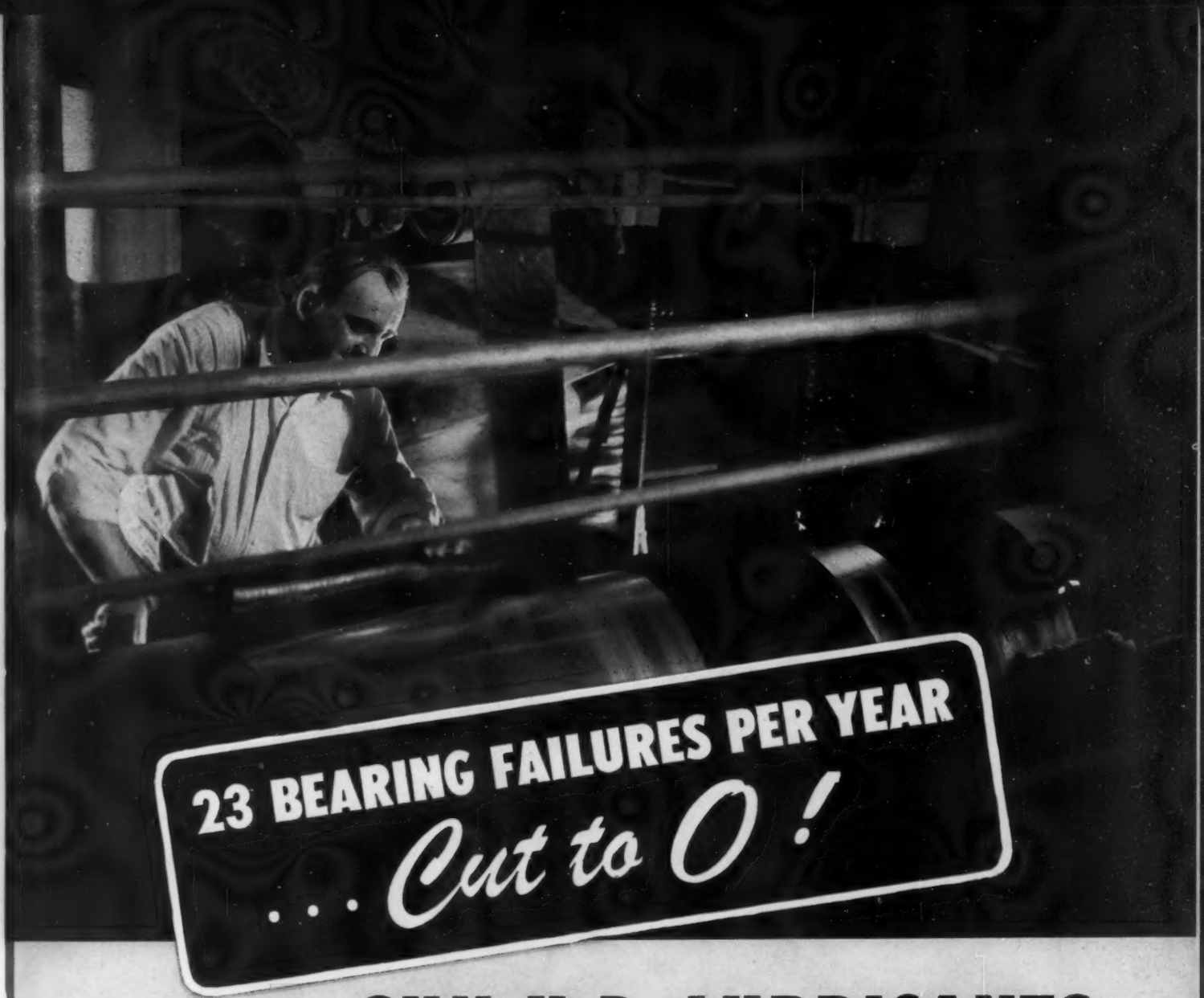

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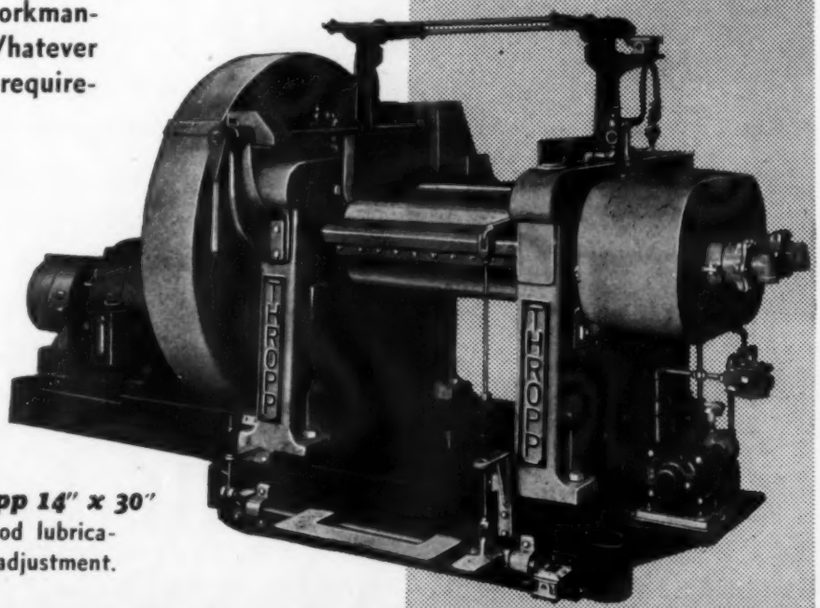

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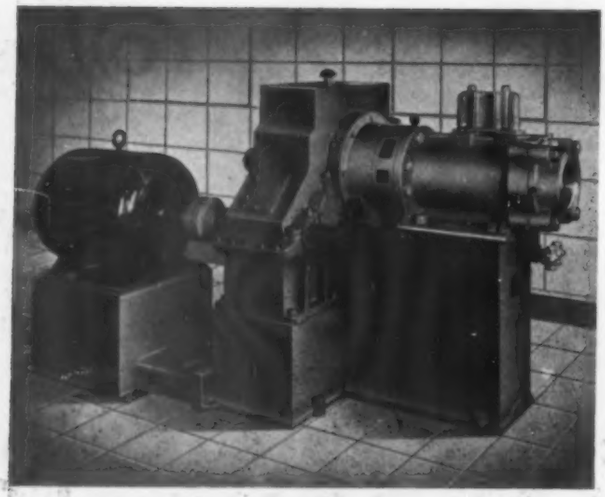

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The RUBBER AGE

VOL. 54, No. 1 OCTOBER, 1943

Some Industrial Hygiene Problems In the Synthetic Rubber Industry

By FLOYD A. VAN ATTA AND ALFRED M. NOYES

Division of Industrial Hygiene, Illinois State Dept. of Labor, Chicago, Illinois

WE HAVE much to learn about the special health hazard involved in the production and use of synthetic rubber. In this discussion we will present some of the facts we have gathered and point out some of the unsolved problems which those engaged in the industry are best equipped to study in their own plants. Such studies should help to prevent industrial disease and are certain to yield economic as well as humanitarian benefits. The economic value of this program was recently emphasized by Mr. S. C. Sufrin of the Rubber Products Branch of the War Production Board (predecessor of the Office of the Rubber Director): "As an economist, I would like to point out that if the laboring people discover that certain jobs, although paying fairly good wages, cause the workers to become ill, the job opportunities are so great that those people leave and go to other jobs, which means a long breaking-in period with attendant interruptions to production."

Without attempting to define either of the terms "synthetic rubber" and "rubber substitute" we shall use them interchangeably in this discussion to indicate any of the synthetic materials which have rubber-like properties.

Neoprene has been rather thoroughly worked out in this country and there has been more experience with it than with most of the other substitutes. The chief potentially hazardous materials in the synthesis are acetylene—the real starting material—vinyl acetylene, and chloroprene. Chloroprene is obtained from acetylene by catalytic condensation to monovinyl acetylene, followed by addition of hydrogen chloride. The processes are indicated in the following equations:

$$2\ HC{\equiv}CH \xrightarrow[NH_4Cl]{Cu\ Cl_2} CH_2{=}CH{-}C{\equiv}CH$$

Acetylene — Vinyl acetylene

$$+\ HCl \longrightarrow CH_2{=}CCl{-}CH{=}CH_2$$

Chloroprene

Acetylene may be classified with the asphyxiant gases. In fairly high concentrations it has a depressant effect on the circulation and respiration and is somewhat narcotic. In the few recorded cases of industrial poisoning there is a question as to whether the harm was done by the acetylene itself or by the hydrogen sulphide or phosphine which it commonly contains as impurities. Vinyl acetylene is probably somewhat more toxic than acetylene but still would be an asphyxiant.

Like many of the other chlorinated compounds, chloroprene—a liquid boiling at 59° C. (138° F.) is considerably more toxic than its parent hydrocarbon. When it is inhaled in comparatively low concentrations it causes irritation of the respiratory tract. Continued exposure may produce a fall in blood pressure, reduction in the respiratory rate and cyanosis. The most

Note: This paper was delivered before the meeting of the Rubber Section, National Safety Council, held in Chicago, October 27, 1942.

serious effects are damage to the liver, kidneys, and testicles, and internal hemorrhage due to the hemolytic action. Von Oettingen suggests that concentrations of 0.3 milligrams per liter, corresponding to about 100 parts per million, may cause toxic effects on long exposure. The maximum safe concentration will, consequently, be something below this value. In addition to the danger from inhalation, chloroprene may be absorbed directly through the intact skin and produce about the same effects that it does by inhalation.

The processes involved in these syntheses will invariably be carried on in closed systems and the materials handled through pumps and piping. The dangers to be considered, therefore, are due to leaks in the systems and to acute exposures from cleaning tanks and piping. One of the larger rubber companies suggests the following precautions in handling processes of this sort where toxic and highly explosive liquids and gases are used:

(A) Escaping vapors must be removed at their source by exhaust ventilation. Coupled with this they recommend general ventilation at the rate of twenty air changes per hour.

(B) Exhaust ducts should be located at points where vapors are likely to be released, such as valves, gauge glasses and similar locations and also in pits and other dead air spaces where vapors might collect.

(C) Skin contact with the liquid should be prevented by proper protective clothing.

Cleaning Pressure Vessels

Safety rules for cleaning out pressure vessels cannot be too strict; the following precautions must be taken:

"1. All valves should be closed and sealed unless a safety man is stationed at such points to prevent their being opened.

"2. Any agitators or other moving equipment must be locked out.

"3. Before entering any such vessel it must be thoroughly purged. This can be done by a combination of several of the following: filling the vessel with water, steaming, applying vacuum, and exhausting. Before opening such a vessel, we evacuate to as much vacuum as possible, bring to zero (gauge) pressure with nitrogen, and repeat this process a second time.

"4. Workmen entering such a vessel must be provided with suitable safety equipment such as goggles, rubber gloves, and forced air masks.

"5. Any extension light used must be of the approved vapor-proof type.

"6. The workman must wear a manhole harness with a strong lanyard attached, and another workman must remain on the outside and retain hold of the lanyard. In some cases where the manhole is near the bottom of the tank it may be practical to omit the manhole harness but there still must be another workman detailed to the specific duty of observing the workman who is inside.

"7. The workman in the vessel must be instructed to come out at the first indication of dizziness or illness and must be removed to clean air.

"8. It must be borne in mind that the vapors of many of the materials used in these processes when mixed with air are highly explosive and all receiving, storage, and processing must be handled accordingly."

Intelligent application of the precautions outlined above will permit the manufacture of chloroprene or any similar synthesis, with little or no hazard to the health of the workers.

Except for the possible production of chloroprene vapors, no further hazards should be experienced in the polymerization of chloroprene. The phenyl-beta-naphthylamine added to the polymer to retard aging, or further polymerization, is not generally considered to be very toxic. We feel, however, that exposure to it should be avoided because of the possible long-range effects. Beta naphthylamine has been cited as a cause of bladder tumors in dye workers, and the addition of the phenyl group would probably not decrease its carcinogenic activity.

Buna Types

These are the polymers of butadiene and its copolymers with acrylonitrile and styrene. None of the simple polymers has been proposed for commercial production in this country, and the important one of the other two seems to be the Buna S type, the copolymer with styrene. Butadiene synthesis is more of a problem for the petroleum and alcohol industries than it is for the rubber industry, but the connection between these industries must be very close in the future, if it is not now. Therefore, some discussion of the synthesis is pertinent to this article.

Butadiene may be prepared from acetylene by the same condensation which is the first step in the production of chloroprene. If this condensation is followed by addition of hydrogen, rather than of hydrogen chloride, butadiene is the end product. This synthesis is the common one in Russia and Germany and has the advantage of producing a material of high purity, but it is said to be more expensive than the production by the cracking of petroleum products. A third method, or rather series of methods, is through fermentation. The most recent of these depends upon the direct fermentation of corn to butylene glycol and dehydration to butadiene.

$$\text{Corn} \xrightarrow{\text{Ferm.}} \underset{\text{1, 3--Butylene glycol}}{CH_3{-}CHOH{-}CH_2{-}CH_2OH} \xrightarrow{\text{dehyd.}} \underset{\text{Butadiene}}{CH_2{=}CH{-}CH{=}CH_2}$$

Styrene is ordinarily prepared from benzene and ethylene, with aluminum chloride as the catalyst, and dehydrogenation of the resulting ethyl benzene. It may also be produced from coal-tar.

$$\underset{\text{Benzene}}{C_6H_6} + \underset{\text{Ethylene}}{H_2C{=}CH_2} \xrightarrow{AlCl_3} \underset{\text{Ethylbenzene}}{C_6H_5{-}CH_2CH_3} \xrightarrow{-2H} \underset{\text{Styrene}}{C_6H_5{-}CH{=}CH_2}$$

Acrylonitrile may be prepared by any of the three processes shown in the following formulas. The method of choice in the future will probably be the third one involving ethylene oxide and hydrogen cyanide, as it does not involve any chlorine.

$$\underset{\text{Ethylene chlorohydrin}}{HOCH_2{-}CH_2Cl} + NaCN \rightarrow \underset{\text{Ethylene cyanohydrin}}{HOCH_2{-}CH_2CN} \xrightarrow{KHSO_4} \underset{\text{Acrylonitrile}}{CH_2{=}CH{-}CN}$$

$$CH_3COOCH_2CH_2CN \xrightarrow{\text{heat}} CH_2{=}CH{-}CN + CH_3COOH$$

$$\underset{\text{Ethylene oxide}}{CH_2{-}CH_2\ (O)} + HCN \longrightarrow CH_2{=}CH{-}CN + H_2O$$

There is no doubt that most of the raw materials and intermediates in these syntheses are highly toxic by inhalation and a number of them also by skin contact. In a general way the remarks made on the synthesis of chloroprene will also apply here, especially as to the precautions required.

Butadiene and Styrene

What directly concerns the manufacturer of rubber substitutes is the materials he receives to polymerize. The material handled in greatest volume will undoubtedly be butadiene. This is a liquid boiling at —3° C. (26.6° F.). It may produce irritation of the eyes, nose and throat, but apparently has no cumulative effect. Below the lower explosive limit (2%) it is mildly narcotic and strongly so in higher concentrations. There is very little information in the literature on the physiological effects of butadiene. The recorded observations, which are mainly concerned with the effects of repeated heavy exposures, may have to be modified when there has been a more complete study of the effects of continued exposure to low concentrations. It should be obvious that skin contact with the liquid is dangerous, due to the low boiling point.

Styrene is a liquid boiling at 145° C. (293° F.). It is possessed of a powerful odor which will prevent prolonged contact with large concentrations if the man involved is a free agent. This cannot be relied on as a control measure, however, as the senses are dulled as a rule when the sense of smell is offended for long periods. Exposure to the vapors may cause skin irritation and conjunctivitis. The vapor is also quite narcotic in comparatively small concentrations. Irritation of the lungs, and liver and kidney damage will follow heavy exposures. Concentrations of 200 parts per million are said to be about the safe maximum.

Acrylonitrile

Acrylonitrile is a liquid boiling at 78 to 79° C. (172-4° F.). The toxic effects of this material are apparently due to the formation of hydrogen cyanide in the body after absorption. According to Dr. Neal of the U. S. Public Health Service a typical cyanide reaction follows absorption. The safe limit should be 20 parts per million or less. This is by far the most dangerous substance so far discussed and should be handled only with the most extreme precautions. The effects are apt to be acute and anyone who shows the slightest symptoms should certainly receive immediate medical attention. It is well known that cyanides are easily absorbed through the skin and it would be well to consider that this compound will be also, at least until there is evidence to the contrary.

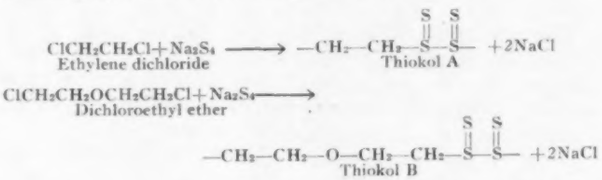
Polymerization is usually carried out in a water emulsion, with the addition of soaps as emulsifying agents, catalysts (such as peroxides, persulfates or peracids), and modifying agents which may be halogenated hydrocarbons, nitriles or sulfur compounds. These modifying agents are generally materials of known high toxicity and should be handled with care. The point of maximum hazard would probably be the removal of the modifying agents from the latex resulting from the polymerization.

Isobutylene Polymers

The member of this group which will be commercially important is the copolymer of butadiene with isobutylene. This introduces the new hazard of butenes which are probably below butadiene in toxicity. The butenes are colorless gases with boiling points between —6° and 2° C. (21° and 36° F.). We have no reason to believe that the control measures should be other than those recommended for butadiene. In polymerizing butene with butadiene to form butyl rubber two highly volatile, inflammable gases are being handled at the same time, which would make the fire and explosion hazard greater than with other copolymers thus far discussed. When isobutylene itself is polymerized the product formed cannot be vulcanized by present methods and therefore finds limited commercial application. Trade names for the polymer are Vistanex and Oppanol.

Thiokols

These are made by condensing sodium polysulfide with chlorinated hydrocarbons. Depending upon which chlorinated derivative is chosen, a variety of rubbery materials can be obtained. The two chlorinated derivatives most frequently used are ethylene dichloride and dichlorethyl ether, both highly toxic.



Ethylene dichloride is a liquid boiling at 84° C. (183° F.), whose vapors are considered of the same degree of toxicity as those of carbon tetrachloride. The suggested maximum permissible concentration is 100 p.p.m. Irritation of the throat, coughing and vomiting have been reported as initial symptoms in man. The possibility of liver damage and other effects of prolonged exposure to moderate concentration indicates the need for keeping the vapors out of the breathing zone of workers. Dichlorethyl ether is a liquid boiling at 178° C. (352° F.). Its close relation to the war gas, dichlormethyl ether, suggests that it too may cause irritation of the eyes and lungs. One state has set a maximum permissible concentration for the vapors at 15 p.p.m.

Because the reaction takes place in aqueous medium and the product is coagulated with acid, the hazard of hydrogen sulfide must be considered in both parts of the process. Past experience has shown that hydrogen sulfide may cause nausea, headache, and irritation of the eyes, as well as loss of appetite and loss of weight when workers are exposed even to moderate amounts day after day. Therefore, hydrogen sulfide should be removed at the source of generation so that the concentration in the workroom air does not exceed 20 p.p.m. At least one article has appeared in which the source of Thiokol odors has been discussed. It is believed that ethylene mercaptan and other sulfur-containing compounds are formed. These may be highly toxic as well as disagreeable. Efforts to keep the hydrogen sulfide out of the workroom air should be just as effective with these other compounds.

Vinyl Polymers

Two of the most important members of this group are polyvinyl butyral (Saflex) and polyvinylidene chloride (Saran). Common to all of these compounds is the hazard of acetylene, the basis for synthesis of the monomers. The monomer for polyvinylidene chloride is made by treating dichlorethane with alkali.

$$ClCH_2CH_2Cl + NaOH \longrightarrow HOCH_2{-}CH_2Cl + NaCl$$

$$HOCH_2{-}CH_2Cl \longrightarrow \underset{\text{Vinyl chloride}}{CH_2{=}CHCl} + H_2O$$

or

$$\underset{\text{Acetylene}}{HC{\equiv}CH} + HCl \longrightarrow \underset{\text{Vinyl chloride}}{CH_2{=}CHCl}$$

or

$$\underset{\text{Ethylene}}{H_2C{=}CH_2} + Cl_2 \longrightarrow \underset{\text{Vinyl chloride}}{CH_2{=}CHCl} + HCl$$

Among harmful materials involved in making other monomers and in effecting polymerization may be mentioned: hydrogen chloride, butyraldehyde, and several catalysts—mercuric sulfate, benzoyl chloride and uranyl acetate in methanol. The various processes are carried on in a closed system. Therefore, the precautions given previously for such handling—proper ventilation and avoidance of skin contact—should be observed.

Mixing, Vulcanizing, Extruding, Etc.

The synthetic rubbers which will be most important commercially will be compounded and handled in much the same manner as natural rubber. This is more than a coincidence, for otherwise the rubber fabrication machinery now available would be useless.

Most of us are familiar with the early history of the rubber industry with regard to hazards from accelerators and antioxidants. Aniline and some of its derivatives, "hexa" (hexamethylene tetramine), the toluidines and paraphenylenediamine caused so many cases of poisoning and dermatitis that there was a rush to develop harmless or less harmful substitutes. With some of the newcomers there have been no reports of harmful effects, but much of this information has come from direct questioning of manufacturers rather than from toxicological experiments.

The agents most frequently mentioned in the fabrication of synthetic rubber are diphenylguanidine (D.P.G.), phenyl-betanaphthylamine (Agerite Powder), phenylalpha-naphthylamine (Neozone), mercaptobenzothiazole (Captax), tetramethylthiuramdisulfide (Tuads), the dihydroquinoline derivatives (Flectols, Agerite Syrup), hexamethyleneammonium dithiocarbamate (Latac), dinitirophenyldimethyldithiocarbamate (Safex). Because some of these materials may contain known toxic substance as impurities—Neozone D contains free aniline—and because of the possibility of harmful effects after long exposure, direct contact with these materials by inhalation or skin contact should be avoided.

Among the plasticizers commonly used with synthetic rubbers, those which have already caused harmful effects are dibenzyl ether and tributyl phosphate, both of which have caused irritation to the respiratory tract, even nosebleeds. The chlorinated naphthalenes have a long history of serious dermatitis and of poisonings which may be fatal. They have been recommended as plasticizers, especially for the extrusion of neoprene, but should be used very cautiously, which means avoiding contact either by skin or by inhalation of condensed vapors. One of the more obvious means of preventing harm from these materials, which are poisonous by skin contact, is personal cleanliness. The need of sufficient, clean washing and bathing facilities cannot be urged too strongly, especially since compounding of rubber is a very dirty job at best.

Solvents

A variety of solvents are used for the preparation of cements and extrusion mixtures, coating fabrics and other materials, and forming seams in some of these coated materials. The synthetic rubbers are a group of materials whose outstanding property is resistance to many solvents which cause swelling and disintegration in natural rubber. Therefore, we must use special solvents when cements and other soft products are made. Coal tar solvents are especially popular. Some have recommended coal tar naphtha (solvent naphtha), a mixture of benzol, toluol and xylol, having definite toxic properties.

Benzol itself is being used to a great extent, especially since the so-called safe substitute, toluol, has been restricted by other war needs. The controversy about toluol as a safe solvent seems to be unending. We do not feel that it has been conducted from an unbiased or scientific viewpoint. Our opinion is that boiling point alone does not determine relative toxicity; one must know the actual concentration of vapor in the air. We do know that toluol has an appreciable vapor pressure at room temperature and that severe poisoning and at least one death have resulted from its promiscuous use.

Nothing will be gained by seeing how much the worker can absorb before blood changes are observed. The fact that there have been cases of chronic poisoning from exposure to relatively low concentrations of toluol would indicate that safe practice requires keeping the concentration as far below the suggested safe limits of 100 to 200 p.p.m. as is practicable. Several years ago a limit of 75 p.p.m. was suggested for benzol. The A.S.A. has upped this to 100 p.p.m.; why we do not know. We do know of a recent death from the use of benzol in an extrusion compound.

Ethylene dichloride and monochlorbenzene are the most common of the chlorinated solvents. Both are highly toxic; suggested limits being 100 p.p.m. for ethylene dichloride and 75 p.p.m. for the monochlorbenzene.

Other solvents frequently used, especially for vinyl polymers, are methyl ethyl ketone and butanol. Methyl ethyl ketone is considered probably more toxic than acetone; therefore the safe limit would appear to be somewhere below 200 p.p.m. The suggested safe limit for butanol has been set at 100 p.p.m.

Buna S and the Butyl rubbers appear to be the only common synthetic rubbers which are appreciably soluble in aliphatic hydrocarbons. If the petroleum naphthas used for dissolving these contain aromatics, as many have been found to do, the suggested safe limit of 1000 p.p.m. must be scaled downward. Before using solvents, or for that matter accelerators, anti-oxidants, etc., which are identified only by trade names, you will be using proper caution only if you learn what they really contain. If you have the facilities you can have it analyzed in your own laboratories. Often it is simpler to communicate with the manufacturer or your Labor Department.

Because so many instances have been observed in industry where a window exhaust fan or wall fan is considered proper ventilation, we mention here that we do not generally approve such installations. Positive control of solvent vapors calls for removal of vapors as close to the point of generation as possible, and in such a way as to carry the exhausted air away from the worker. Nor is the current rage for down-draft exhaust entirely justified. The vapors of most of these solvents are heavier than air and should fall, certainly, but it should be obvious that a down-draft exhaust beneath it cannot possibly remove solvent vapor from the top of a broad table without the workers along the edge of the table getting it first. This does not mean that ventilation near the floor should not be used to reduce fire hazard, but it does mean that it is not necessarily effective in protecting the workmen from inhalation of vapors. There are a multitude of cases of illness from these operations on spreading tables, and numerous deaths.

Vulcanization

This admittedly complex process can give rise to a number of toxic gases, such as hydrogen sulfide, carbon disulfide, mercaptans, etc. When neoprene was introduced into fabrication processes there were frequent complaints of a "tear gas" generated during vulcanization. Most processors claim that recent grades do not give off obnoxious gases. The Thiokols, however, still retain the reputation of being the smelliest members. These possibilities of poisonous and irritating gases during vulcanization show the need for adequate control by exhaust ventilation.

Dusting

For a long time it was thought that free silica and asbestos were the only hazardous dusts from the standpoint of pneumoconiosis. In recent years it has been shown that silicates—talc, mica, etc.—are capable of causing a lung disease called "silicatosis." For this reason, and the fact that it makes a great difference in plant housekeeping, dusting should be done on tables provided with enclosures and exhaust ventilation. Our own observations have shown that these dusting operations frequently produce excessive contamination when done in the open.

Summary

The data we have presented in this paper can best be summarized by a review of the most hazardous operations and the proper means for their control.

Synthesis and Polymerization—Highly volatile liquids and gases, most of them quite toxic and highly inflammable, are pumped from reservoirs into reaction vessels. Control measures include ventilation wherever leaks may occur, prevention of skin contact, and a strict set of safety regulations, as outlined above, for all operations requiring a worker to enter tanks or reaction vessels.

Fabrication—Avoid use of the known bad actors among accelerators, antioxidants, etc., if possible. In any case, wherever potentially toxic materials are handled, the resulting airborne dusts and vapors should be removed at source by exhaust ventilation. The processes which may be the source of these contaminants are: weighing, mixing on mill or Banbury, extrusion, vulcanization, dusting, spreading, and cementing.

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Ridbo 369—Fortifying Plasticizer for GR-S

By C. R. JOHNSON

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THROUGH research extending over several years, Ridbo Laboratories, Inc., have developed a new substance designated as Ridbo 369 which, when used with GR-S (Buna S), shows properties that should be useful in the manufacture of rubber products. While functioning as a plasticizer, this material also acts as a fortifying agent by improving tensile, elongation, and resistance to tear hot and cold. In addition it serves to overcome to a marked degree the excessive loss of elongation after heating which characterizes all GR-S compounds.

Many tire compounders have come to view this elongation weakness of GR-S as one of the main causes of tread failure, particularly in truck and bus tires. Ridbo 369 shortens the time of mixing. It incorporates faster and reduces the time of pigment addition. When used with semi-reinforcing furnace black (S.R.F.B.), 40 parts on 100 parts of GR-S, it shows a 35% improvement in tensile and elongation and an 85% improvement in hot and cold tear resistance. Modulus is materially reduced.

Ridbo 369 is a viscous, dark liquid, with a specific gravity of 1.06. It is derived after chemical reaction from an organic vegetable source. For convenient handling in processing, it should be heated to about 160° F., but it mixes readily at room temperature.

Table I shows test results with Ridbo 369 in a tube or carcass type formulation with semi-reinforcing furnace black. Table II covers the use of the material in a tread formulation with easy processing channel black (E.P.C.B.). It will be noted that an increase in elongation and decrease in modulus is shown. Also noteworthy is the high retention of tensile and elongation after 24 hours in the oven at 100° C.

Review of many tests of Ridbo 369 indicates that it should be useful in tires and inner tubes and in any rubber products requiring good tensile, high elongation, low modulus, good tear resistance, and good retention of elongation under heat and service conditions.

TABLE I—TUBE OR CARCASS STOCK

	A	B
GR-S	100.	100.
S.R.F.B.	40.	40.
Zinc Oxide	2.5	2.5
Agerite Powder	1.	1.
Altax	1.5	1.5
Barak	1.	1.
Sulfur	1.75	1.75
Bardol	10.	.....
Ridbo 369	.....	10.
	157.75	157.75

Tensile @ Break

Cure 280° F.		Index		Index
20 mins.	1130		1610	
25 mins.	1180*	100	1600*	136
30 mins.	930		1430	

Modulus @ 300%

20 mins.	540		410	
25 mins.	590	100	510	76
30 mins.	600		590	

Elongation

20 mins.	550		805	
25 mins.	530	100	710	134
30 mins.	410		420	

Tear Tests (25 min. cure)

	Tested at 22° C. lbs./in./ width	Index	Tested at 70° C. lbs./in./ width	Index
Comp. A	112	100	55	100
Comp. B	203	181	102	186

Tensile Tests @ 100° C. (25 min. cure)

	Tensile	Index	Elongation	Index
Comp. A	500	100	260%	100
Comp. B	460	92	330%	127

Oven 24 hrs. @ 100° C. (25 min. cure)

	Tensile	Index	Elongation	Index
Comp. A	740	100	140	100
Comp. B	1000	135	230	165

Shore Hardness (25 min. cure)

Compound A	43
Compound B	44

* Optimum.

TABLE II—TREAD TYPE STOCK

	A	B
GR-S	100.	100.
E.P.C.B.	50.	50.
Zinc Oxide	5.	5.
Captax	1.5	1.5
D. P. G.	.2	.2
Sulfur	2.	2.
Bardol	10.	....
Ridbo 369	....	10.
	168.7	168.7

Tensile @ Break

Cure 292° F.		
45 mins.	2550	2400
60 mins	2700	2500
75 mins.	2350	2750
90 mins.	2390	2450

Modulus @ 300%

45 mins.	1290	590
60 mins.	1520	820
75 mins.	1700	950
90 mins.	1700	1050

Elongation

45 mins.	500	800
60 mins.	470	690
75 mins.	410	640
90 mins.	420	590

Tear Resistance

Comp. A	45 min. cure	320 lbs./sq. in.
Comp. B	60 min. cure	388 lbs./sq. in.

Oven Aging 24 hrs. @ 100° C.

		Tensile	% Loss	Elongation	% Loss
Comp. A	45 min. cure	1980	26.6	195%	61.0
Comp. B	60 min. cure	2600	5.5	465%	27.4

The Compars —New Family of Rubber-Like Materials

BY EDGAR S. PEIERLS
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A NEW name to add to the growing list of synthetic plastics is "compar" — a group of coal-limestone-and-air derivatives which might be called the missing link between plastics and synthetic rubber, notable for unparalleled immunity to the new hard-to-handle aviation "super-fuels." The development of an almost endless chain of compar variations by the Resistoflex Corporation grew out of the demand by warplane designers for a flexible material to handle toluol, xylol and benzol—which give the potent new U. S. super-gasolines their tremendous power, but which quickly destroy most organic materials.

The compars are transparent, flexible, rubber-like plastic materials, five to twenty times more wear-resistant than natural rubber, and the most solvent-proof rubber substitute yet developed. Some of the compars are already in use in warplane fuel and hydraulic hose, naval Diesel engines, chemical warfare equipment, in Sperry Gyropilots, and in the form of protective gloves, aprons and shoe-coatings for workers exposed to irritating petroleum solvents. Scores of other war uses are in the development stage, while many post-war uses are expected when the new aircraft super-gasolines are available for civilian cars and trucks.

The name "compars" is used to distinguish between the basic polyvinyl alcohol resins, which are water soluble powders and the many derivatives, compounds and modifications—developed by the Resistoflex Corp. —which have physical properties entirely unlike the original resin. The name of these latter rubber-like materials derives from the letters in the words "Compounded Polyvinyl Alcohol Resin."

Wide Range of Properties

This new plastics family-group are noted for pronounced flexibility, toughness and abrasion resistance. Some types of compar are not only resistant to, but chemically entirely unaffected by the action of organic solvents, including the aliphatic and aromatic hydrocarbons, the chlorinated hydrocarbons, the ketones, etc. Others exhibit very low permeability to industrial, refrigerant and military gases, high tensile strength, freedom from aging or oxidation—all factors tending toward long service life. Great progress has been made in widening the already large range of operating temperatures within which compar retains its other valuable properties. Some varieties will remain flexible at temperatures as low as —70°F. or as high as +300°F. Others have been so modified as to be insoluble in water at all temperatures, with swelling limited to 10%, and water absorption to about 15%. Development work now in progress indicates the possibility of still further decreasing the water sensitivity of these compounds.

Milling Similar to Rubber

Production of the compars into rigidly specified forms requires an unusual combination of methods including some common to the plastics industry and some used in the manufacture of rubber. It is milled, for example, as is rubber, but instead of building up the customary blanket on one of the rolls, a thin cohesive film is produced which has not yet completely fused and is not at all comparable in consistency to either milled or calendered rubber stock. Unlike rubber, it need not be vulcanized. Further transformation into finished and semi-finished products is accomplished by extrusion or molding.

TABLE I—EFFECTS OF VARIOUS SOLVENTS ON THE PHYSICAL PROPERTIES OF A TYPICAL EXTRUDED COMPAR FORMULATION

Test	Specific Gravity at 72° F.	Shrinkage or Expansion in 6 in. (per cent)	Tensile Strength (lbs./sq. in.)	Elongation in 2 in. (per cent)	Hardness (Durometer)
Original Material Before Immersion	1.259	.....	5,236	213	85
66% Gasoline by Vol. 24% Ethanol 10% Benzene	1.195	—1.0	5,057	180	86
Gasoline (leaded)	1.260	—0.30	5,255	220	85
Kerosene	1.255	+0.30	5,247	220	84
Benzene (Benzol)	1.251	+0.30	5,290	225	84
Xylol	1.260	+0.20	5,351	220	84
Acetylene Gas	1.256	+0.10	5,340	220	85
Methylene Dichloride	1.261	—0.40	5,110	225	84
Trichlorethylene	1.253	+0.10	5,140	225	86
Carbon Tetrachloride	1.259	0.00	5,084	145	84
Monochlorbenzol	1.258	+0.10	5,026	190	84
Ethanol (Anhydrous)	1.181	—4.30	5,779	190	87
Ethylene Glycol	1.186	+4.70	4,335	185	77
Acetone	1.246	—1.20	5,203	175	87
Petrohol (Isopropyl alcohol)	1.224	—1.30	5,971	165	89
Methyl Acetate	1.269	—0.70	5,403	185	85
"Freon" Gas	1.270	—0.50	5,636	205	86
Butane Gas	1.268	+0.30	5,352	200	86
Propane Gas	1.267	+0.20	5,529	200	87
Sulfur Dioxide	1.269	+0.50	5,497	215	86
Oxygen bomb accelerated aging test 300 lbs. oxygen pressure at 160° F. for 240 hrs.	1.259	+0.10	4,990	220	86

Careful control of each operation in the compounding and fabricating of these materials permits finished products of widely varying, predetermined Durometer hardness, resistance to organic solvents, resilience, flexibility, translucence, etc. Such controls include holding the loss of solvents during processing to within a range of plus or minus 0.1 per cent; keeping thickness of the milled sheet within tolerances of plus or minus 0.001 in.; and maintaining extruder temperatures within plus or minus 1 degree at three different points.

The outstanding characteristic of compar is its inertness to organic solvents. The effects of various solvents on the physical characteristics of a typical extruded compar formulation are shown in Table I. The physical properties of a typical compar formulation are indicated in Table II.

TABLE II—PHYSICAL PROPERTIES OF A TYPICAL COMPAR FORMULATION

Property	Extruded	Molded
Tensile Strength (lbs./sq. in.)	5236	2121
Elongation in 2 in. (%)	213	445
Permanent Set (%)*	78	80
Cold Flow (%)**	63.2	63.6

* This is the percentage elongation measured after stretching to three-fourths of ultimate elongation, holding for 10 minutes, releasing, and allowing to recover for 10 minutes.

** This is the percentage deformation of a 0.5 in. cube subjected to a pressure of 4,000 lbs./sq. in. at 120° F. for 24 hours and allowed to recover for 24 hours.

Major Applications of Compars

One of the major applications which we have developed for compar is in the construction of hose and hose assemblies. High octane aircraft gasolines containing up to 40% or more of hard-to-handle aromatic hydrocarbons must be handled; diesel fuels may not be contaminated by fuel line erosion; fine orifices or delicately balanced parts of hydraulic mechanisms or lubricating systems must not become gummed or clogged due to attack by the hydraulic or lubricating oils on the inner wall of the hose; flexible non-metallic conduits must carry refrigerant or other toxic gases without leakage. Moreover, all of these difficult tasks must be performed regardless of the scalding heat of the desert or the searing cold of the stratosphere.

Resistoflex transparent tubing, also made of compar, affords the laboratory worker, doctor, dentist or other scientist a new flexible conduit. Transparent, as its name implies, it permits direct observation of the flow of liquids. Chemically unaffected by almost all organic solvents, it can be used in contact with many liquids which seriously attack or deteriorate rubber or the various synthetic rubbers. The further plus of Resistoflex tubing lies in its real imperviousness to gases. The disagreeable warning additives with which both natural and manufactured gases are saturated, are not absorbed by compar and the laboratory atmosphere is not poluted with these noxious fumes.

Resistoflex molded compar products are also playing an important role in industry. Washers, gaskets and seals for holding hard-to-handle solvents, aligning rings for the assembly of radio tubes and other electronic devices, transmission rings for delicate driving mechanisms, diaphragms of various kinds, are only some of the many intricate shapes which have been successfully developed. Amenable to any number of different formulations, compar lends itself to the production of parts specifically designed and engineered for the job and which, depending on the compound used, are characterized by great tensile strength, chemical inertness to fuels, oils and other organic solvents, imperviousness to gases, freedom from aging and oxidation, resistance to abrasion and impact, vibration and flexing over a wide temperature range.

Another important field for compar is in the manufacture of gloves, aprons and other protective garments designed to prevent dermatitis and folliculitis among workers who are in contact with sulfur-base cutting oils, dry cleaning and degreasing fluids, and other toxic or irritating solvents. These items are particularly tear and abrasion resistant because they are not chemically weakened by contact with oils and other solvents to which they are exposed. The specific formulation of compar used in making these gloves contains no sulfur or other ingredients which might tarnish finely polished metal surfaces. Resistoflex Industrial Gloves serve the dual-purpose, therefore, of not only protecting the skin of the wearer but also the finish of the materials being handled.

Flexibility is a feature of the compars.

Available in Solution Form

Compars are also available in solution form. Here again specific formulations have been developed for particular applications. One of these is for coating the wire baskets used for transporting and degreasing airplane and other metal parts, readily forming a resilient film, unaffected by both the insoluble sulfur-base cutting oils and the degreasing solvents and preventing any scratching or damaging of the parts. Another solution, when applied to the welts and uppers of industrial shoes, effectively oil-proofs and solvent-proofs the shoes, protecting both the shoes and the worker's feet from these materials. Other solutions are available for coating wood, fabric and paper. One of the most interesting applications of compar solution is as a paint to the inside of a wooden or composition board fumigating box or chamber to make such box entirely gas-proof. This inexpensive construction, replacing elaborately soldered metal sheathing, is only one of many where compar has replaced other more critical materials and at substantial saving in ultimte cost.

NUMBER **EIGHT** OF A SERIES OF ARTICLES ON

Better Management for the Rubber Factory

VIII—INVESTED CAPITAL

By ARTHUR ROBERTS

FROM our field studies among manufacturers of rubber products, we estimate that, roughly, 70 per cent do not consider the return on capital investment, only the net profit on sales. If they earn a reasonable percentage on sales, they are satisfied; yet, the ultimate profitableness of a business is measured by the return on invested capital. The capital invested in your business is the original investment augmented with profits earned each year or diminished by losses deducted. The net profit on sales in dollars computed on this investment gives the percentage of return.

Neglect is "Business Sabotage"

Neglecting the importance of earnings on investment has always been hazardous and now it borders on business sabotage. Its computation is now a "must" because with war restrictions and high taxation, every angle of operation must be checked and re-checked to make sure that loss-leaks are eliminated and profits kept at maximum. The manufacturer of rubber products may go far astray if he stakes his all on the net profit on sales today, insofar as business analysis is concerned.

War restrictions are depressing volume or margin and the general remedy is to cut expenses to offset this trend but even the management able to cut expenses in ratio to sales equal to the average before the war should not be too cocky about it unless the earnings on investment are satisfactory. The investment may be high and the decrease in dollar volume may show unsatisfactory earnings on investment even though the percentage of profit is up to average.

For example, one rubber goods manufacturer had a volume of $450,000 in 1942 and earned 6 per cent net profit, or $27,000. His net worth was $600,000, so the $27,000 net profit on sales gave him 4½ per cent profit on capital investment. War restrictions cut his volume this year to $360,000, he effects economies and manages to net the same percentage of profits as in 1942, but 6 per cent of $360,000 is $21,600, and his net worth or capital investment is now $627,000, because it has been increased by the $27,000 net profit earned in 1942.

This $21,600 net profit computed on $627,000 investment gives only 3½ per cent return, a decrease of about 22 per cent in dollar earnings on invested capital. If the downward trend in sales volume, dollar volume or margin continues, the earnings on investment will decrease further, and it is this percentage, the return on the capital invested in your business, that is a better gage of managerial efficiency and financial stability today than the net profit on sales.

The manufacturer of rubber products who is overcapitalized had better watch his step carefully for the duration. The management doing business on a more conservative investment has the edge on him today. Study these figures and learn why:

Rubber products manufacturer A had a volume in 1942 of	$600,000
Upon which he earned a net profit of	.06%
Rubber products manufacturer A's net profit for 1942 in dollars	$ 36,000
Rubber products manufacturer A has a capital investment of	$800,000
$36,000 represents a return on capital investment of	.04½%
Rubber products manufacturer B had a volume in 1942 of	$600,000
Upon which he earned a net profit of	.06%
Rubber products manufacturer B's net profit for 1942 in dollars	$ 36,000
Rubber products manufacture B has a capital investment of	$400,000
$36,000 represents a return on capital investment of	.09%

B is the best business manager because he makes his invested dollars work harder than A and this is the ultimate yardstick of business efficiency, even in normal times.

Accurate Check Is Essential

In some cases reviewed on a recent field study, the investment carried "water," which gave the management an erroneous conception of earnings. If your net worth is inflated, you may be earning a bigger return than you figure but the "water" therein obscures the fact. For example, if your net worth, otherwise, your invested capital, is $450,000 on paper and carries

$90,000 inflation, and your net profit on sales is $18,000, you will figure you earned 4 per cent on investment. But your net worth with the "water" squeezed out of it, say it deflates to $360,000, so the $18,000 net profit on sales is a 5 per cent return on investment. On the other hand, if your net worth is less on paper than it should be, the return on investment will be exaggerated so you see it is very important that you check the accuracy of your invested capital. In the final analysis, you are interested in the return you get for your investment in your business and if you keep this return to a satisfactory level, the size of the net profit on sales is of secondary importance, at least for the duration.

This problem will project itself into the post-war period, when heavy demand, long bottled up, will necessitate expansion and modernization of equipment for many rubber goods manufacturers. Suppose manufacturer A with a volume of $600,000 modernizes and increases the size of his plant in the postwar period at an investment of $80,000, and that he increases sales that year by $80,000, also net profit from 4 to 5 per cent, hence, sales would be $680,000 and net profit $34,000, which on an investment of $800,000, would be 4.2 per cent earnings.

Rubber goods manufacturer B invests $80,000 in a similar modernization program and increases sales from $600,000 to $680,000, or $80,000, also net profit from 4 to 5 per cent, or $34,000. His return on $600,000 investment is 5.6 per cent so he would earn ⅓ more on his invested capital although in dollars, the return would be the same in both instances.

This indicates that the profit on modernization depends to some extent on your capital investment and explains why some rubber goods producers in bygone years complained that modernization did not get the results expected whereas others reported excellent results. It is obvious that the management that depends entirely upon the net profit on sales to tell whether it is profiting on a program of modernization, an advertising investment, or other monies sunk in a business will often get an erroneous answer.

Recently, we made a survey among rubber goods manufacturers in the East to get a line on capital investment earnings and our survey work sheets show this result. In 1942, one company (A) earned 4.7 per cent on sales and 6 per cent on investment, another (B) earned 2.8 per cent on sales and 7.4 per cent on investment, and another (C) earned 4.2 per cent on sales and 11.9 per cent on capital invested. Figured by the usual yardstick—profit on sales—it would seem that A did the best managerial job, but this is erroneous because the ratio of net profit to capital invested is the ultimate measure of profitableness today, not necessarily the profit on sales, although this should be considered. B was the best business man, he got more out of his invested dollars than A or B.

The government is looking for additional sources to tax for income and the invested capital is a possibility, some legislators advocating that a limit of 6 per cent on capital investment be decreed. This may put many rubber goods manufacturers in a financial hole so it is most essential that those in this industry give more thought to this matter than they have heretofore in order to be able to appraise such legislation as it applies to their business and take intelligent action to counteract an undesirable impost.

Properties of Buna S with Gilsonite

A STUDY of the electrical and mechanical properties of compounds of Buna S with gilsonite was undertaken a short time ago by the National Bureau of Standards with a view to the utilization of these compounds for insulating wires and cables. The low power factor and capacitance of Buna S favor its use as insulation for communication lines, but without the addition of filler it is too weak and tears too readily to be of practical value.

Carbon black, as a filler, has been shown to develop mechanical strength in Buna S, but it also raises the power factor and dielectric constant. The resulting compound is then unsuitable for insulating communication cables. This loss of electrical quality may be avoided and fair mechanical strength is developed when the hard asphaltite, gilsonite, is employed as a filler instead of carbon black, according to results reported by Messrs. Selker, Scott and McPherson in a recent issue of the *Journal of Research*. Gilsonite, a native asphalt-like rock, is available from domestic sources in quantities adequate to supply reasonable demand.

A series of compositions varying from a Buna S base compound with no filler to one with 150 parts by weight of gilsonite per 100 parts of Buna S polymer was investigated. The highest tensile strengths were observed for compounds containing 40 parts of gilsonite by weight. This compound when vulcanized at 162°C. for 20 minutes had a tensile strength of 1,200 lb./in.^{2} and a tensile stress of 560 lb./in.^{2} at 200 per cent elongation. Prolonged vulcanization caused little change in either mechanical or electrical properties. The temperature of embrittlement of this compound was —53°C., which is of the same order as that of the commercial insulating compounds.

The dielectric constant of a pure gum compound of Buna S was 2.88 at 100 cycles per second and was 2.78 at 100,000 cycles per second. The corresponding values of the power factor were 15×10^{-4} and 145×10^{-4}, respectively. With increasing amounts of gilsonite, the changes with frequency became smaller, about in proportion to the amount added.

The water absorption of the Buna S polymer used in this investigation was so high that it was unsuitable for some types of electrical insulation. This was probably the result of impurities remaining in the polymer from manufacturing operations, since it was produced early in 1942 and was known to contain a relatively large percentage of soap. Extraction of the crude synthetic by prolonged soaking and washing with water before compounding effected a significant improvement.

Except for water absorption, most of the requirements of the United States Coast Guard specifications for submarine and underground cable are fulfilled by a Buna S-gilsonite compound. The load required to produce compression cutting was 1,000 lb. as compared with the specified value of 650 lb.; resistivity was 3×10^{15} ohm-cm as compared with requirements varying from 1 to 6×10^{15}. Although the tensile strength was a little lower than specified, the modulus of elasticity was higher, and the dielectric strength, as well as other electrical properties, were as required.

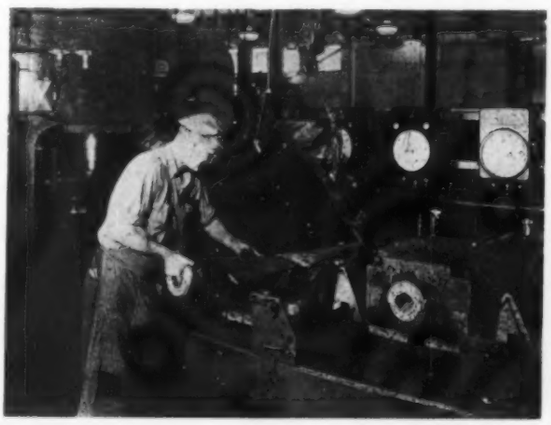
Unique 100-Ton Rotary Apparatus Cures Propeller Blade Fairings

A HUGE merry-go-round, forty feet in diameter, gives new propeller blades a ride in the East Hartford, Conn., plant of the Hamilton Standard Propellers Division of United Aircraft Corporation. Instead of catching the brass ring the blades catch rubber fairings, or cuffs. For the merry-go-round is in reality a 100-ton rotary curing machine. In design and conception it is completely novel, and so far as it is known there is nothing similar in the field of manufacturing.

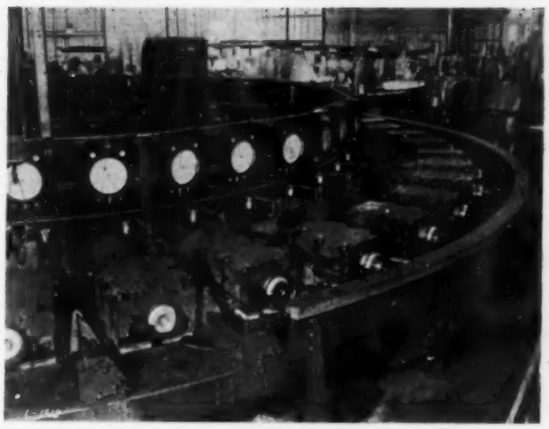
The huge steel turntable turns on rollers mounted on a concrete foundation. The outer rim of the table is flat and is divided into 42 separate slots, each of which is a sector carrying a half-ton mold into which the blade fairing assembly is inserted for curing. Each slot has its individual system of air, steam, water and electricity, automatically controlled through cam-operated valves and Bristol pressure controllers. Main supply lines are brought in through the center of the turntable by swing joints and slip rings.

The machine cures two sets of 21 blades simultaneously. Each mold starts at a loading station, turns to a gap-type hydraulic press, then moves successively through a steam heating cycle, a water cooling cycle, and finally to an unloading station half-way around the circle. At the last point a similar cycle is started and repeated on the other half-circle.

The machine turns intermittently clockwise, advancing one blade sector every 12 minutes, activated by a pneumatic ratchet drive from a 14-inch air cylinder connected to the shop's regular compressed air lines. This movement allows just over four hours for each curing cycle, or half-turn of the table. A complete revolution therefore requires more than eight hours.



Unloading a propeller blade from the 40-foot merry-go-round at the Hamilton Standard Propeller plant. The blade mold cover is raised and the fairing, cured after its four-hour treatment, will next be trimmed.



Rubber fairings of propeller blades being cured in the merry-go-round molds. Blades at far right are at cooling stage and pass clockwise to left of picture in cooling cycle. Blade at far left is cured and ready for unloading.

The first step in the operation is to coat the inside of the mold at the loading station with wax, after which the steam in that mold is turned on. A blade, about which a fairing has been built by hand from molded pieces of sponge rubber, covered with sheets of uncured rubber, is then inserted into the mold, which is loosely bolted. The turn of the table carries the mold under one of the two 100-ton Farquahar hydraulic presses, which closes it under pressure. This forces out excess rubber and allows the mold bolts to be tightened.

After the mold with its blade advances to the next position a canvas and wool insulation blanket is put over it to conserve heat and protect workers. The table then carries the mold by progressive steps about one-third of the way around its circle, completing the heating cycle under steam pressure. At this point the heat is turned off and refrigerated water is circulated through the mold. Blade and mold are then cooled for a little over an hour until the combination reaches the unloading station 180° from the loading point.

The huge Farquahars are among the largest open-sided presses ever made. The mountings of the rotary table near the presses are on steel springs so that there will be a slight "give" to bring the table into contact with the lower platen of the press while the mold is being closed. When the pressure is released the table lifts and clears the lower platen by approximately one-sixteenth of an inch.

Six electric hoists travel on an overhead track to open and close molds. Two are of 2,000 pounds capacity, and four of 1,000 pounds. These are supplemented by two 500-pound crane hoists.

Abstracts of United States Patents on the Compounding and Use of Synthetic Rubber

By FREDERICK MARCHIONNA, M. S. Chem.

Part XI

Diehl—U. S. Pat. 2,279,450—April 14, 1942. *Gasket Material.* (Assigned to Detroit Gasket & Mfg. Co., Detroit, Mich.).

A gasket having a Shore hardness between 75 and 100 is made from a mixture containing from 40 to 80 parts (and preferably 65 parts) of asbestos fibres and about 60 parts of cork powder (passing through a 30-mesh sieve), with sufficient buna or preferably polychloroprene rubber as a binder to cement the fibres. Thus, a gasket is made from a mixture of asbestos powder (6.5), cork powder (6), and neoprene (10) to form a mass which is compounded with the usual curing agents and inorganic fillers if desired. This composition is sheeted, formed into a tube of the required diameter, and flat gasket rings cut therefrom and cured, thereby obtaining gaskets which can be resistant to hot alkali washing at 210° F. and which are highly resistant to oils.

Gumlich—U. S. Pat. 2,280,484—April 21, 1942. *Reclaiming Process.* (Assigned to General Aniline & Film Corp., New York, N. Y.).

Natural or synthetic butadiene rubber wastes are reclaimed by heating at 110° to 160° C. in the presence of 3 to 8% of the reaction product of a mono-aryl hydrazine with an aldehyde or ketone, which includes benzaldehyde-phenyl hydrazone, benzaldehyde-diethylamine-phenyl hydrazone, para-hydroxy benzaldehyde-phenyl hydrazone, and the phenyl hydrazone of acetophenone, nitro-acetone, etc. In one example, waste from vulcanized Buna S made from 75 parts of butadiene and 25 parts of styrene is mixed with 5 to 10% of benzaldehyde-phenol hydrazone, rosin, paraffine and stearic acid, in proportions of 4:1:1:1, and then heated with an air stream at 130° C. at a pressure of 3 atmospheres, thus producing a good reclaim.

Nowak—U. S. Pat. 2,281,375—April 28, 1942. *Electrical Insulation.* (Assigned to General Electric Co., Schenectady, N. Y.).

An electrical conductor is insulated with a jacket layer from a vulcanized mixture containing a vulcanized copolymer of butadiene and acrylic nitrile and a partially depolymerized copolymer of the same monomeric materials which acts as plasticizer for the vulcanized copolymer. The use of this plasticizer permits the insulation to retain its flexibility for a long time and over a wide range of temperatures. The depolymerization of the Buna N is preferably effected by heating the copolymer at 110° to 140° C. in the presence of air or oxygen and for a sufficient length of time to obtain a plasticity, in a Defo-hardness machine, of 100. (The Defohardness test is described in *Kaut.*, Vol. 14, p. 203, 1938.) A suitable compounded stock for the insulation comprises Perbunan (25) with the necessary curing agents, quartz powder, kaolin, talcum, etc., as fillers, and polyacrylic acid ethyl ether (5), with the depolymerized Buna N (10). This stock is extruded over the conductor and a lead sheath slipped over the insulation layer.

Pearl—U. S. Pat. 2,281,594—April 28, 1942. *Sealing Tube.*

In a heat exchanger of the vertical long tube type having a series of tubes and a tube sheet provided with apertures for receiving the ends of each tube, the tube sheet is sealed with an annulus of neoprene, butadiene or Butyl rubber, located between the outer face of the end portion of each tube and the adjacent wall of an aperture in the tube sheet. Between the end portion of the tubes and the tube sheet there is provided a narrow, annular recess or channel, measured radially of the tube. An annulus, or preferably a number of the above synthetic rubber rings, made slightly thicker than the annular recesses, are forced into the recesses under pressure, thereby causing tight engagement with the faces of the channel produced by the tube sheet and the outer surfaces of the tubes. These synthetic rubber rings are preferably so formed that they are convex toward the location of higher pressures in the system, whereby when such pressure is exerted against the ring it tends to distort the same against both the tube and the channel face, and thus improve the sealing capacity of the rings.

Dietzel—U. S. Pat. 2,282,948—May 12, 1942. *Plastic Polysulfide Resins.* (Assigned to Rutgerwerke Akt. Ges., Germany).

In a method of preparing a solution in organic solvents of a polyalkylene polysulfide product, the polysulfide plastic is dissolved in a solvent from the group consisting of pyridine, pipiridine, and chinoline, by heating at a sufficient temperature and for a sufficient length of time to dissolve all of the polysulfide plastic. In one example, a polyalkylene polysulfide is compounded with lamp black, molded, and cured. The cured mass is ground with powder, mixed with pyridine, and heated to about 110°C. until a mobile, clear solution containing 10% of the polysulfide is obtained. The lamp black may be filtered off from such solution, and the polysulfide recovered, if desired, by pouring the solution into water, dilute mineral acids, etc., thereby obtaining a soft, elastic mass. The solution may be used for coating or impregnating articles. Any desired quantity of natural rubber may be dissolved in the solution.

Herman—U. S. Pat. 2,283,439—May 19, 1942. *Accumulator Diaphragm. (Assigned to Vickers, Inc., Detroit, Mich.).*

A flexible diaphragm for separating gases and liquids in fluid pressure accumulators comprises an annularly corrugated flexible sheet of synthetic rubber, which can be flexed without substantial stretch, in form of hemispherical sections in which the diaphragm proper is diametrically positioned. This diaphragm is provided with a plurality of small raised ribs on its liquid contacting surface which will provide drainage paths extending to the liquid outlets, and by these any trapped liquid pockets will be completely drained when emptying the accumulator. In order to prevent rupture of this synthetic rubber diaphragm by fluid pressure at the portion over-

lying the liquid inlet, it is reinforced with a fabric which is subjected to lateral displacement within the diaphragm. This fabric is placed beneath but closely adjacent to one surface of the diaphragm. The location of the reinforcement fabric will be visually evidenced by locally flexing the diaphragm adjacent to the edge of the fabric. The type of synthetic rubber used is not specified. This diaphragm is designed for use as separator in an air-loaded accumulator of the spherical type used in power transmission systems.

Habgood et al—U. S. Pat. 2,284,280—May 26, 1942. *Copolymeric Products.* (Assigned to Imperial Chemical Industries, Ltd., London, England).

The patent treats with and claims the production of an interpolymer of 1-cyano-1.3 butadiene with chloroprene, with or without other polymerizable substances such as styrene, acrylic nitrile, vinyl acetate, methyl methacrylate, etc. The production of copolymers from 47 parts of chloroprene and 20 parts of 1-cyanobutadiene, or from 75 parts of chloroprene and 15 parts of 1-cyanobutadiene and 10 parts of acrylic nitrile are given. Any such copolymeric product (100) is mixed with magnesium oxide (10), rosin (5), phenyl-beta-naphthylamine (2), cottonseed oil (5), gas black (35), sulfur (1), and zinc oxide (10), formed into sheet and cured at 141°C. for one hour, thereby producing a material having a Shore hardness of 64, an elasticity of 80, a tensile strength of 252 kg./sq. cm., and an elongation at break of 550, which will swell only slightly in hot mineral and vegetable oils. In another example, the copolymer (100), magnesium oxide (10), lamp black (30), channel black (35), pine tar (5), zinc oxide (10), sulfur (1), and phenyl-beta-naphthylamine (2), when cured as in the previous instance, shows very slight swelling in Diesel oil, petroleum, and mineral oils.

Habgood et al—U. S. Pat. 2,284,281—May 26, 1942—*Copolymeric Products.* (Assigned to Imperial Chemical Industries, Ltd., London, England).

A variation of U. S. Patent 2,284,280 for producing interpolymers of 1-cyanobutadiene, in which the chloroprene of the first patent is replaced with isoprene or butadiene, etc. In one example, 30 parts of 1-cyanobutadiene is copolymerized with 45 parts of butadiene in emulsion form; or there may be used 25 parts of cyanobutadiene with 50 parts of butadiene. Any such interpolymer (100), when compounded with gas black (50), a plasticizer (4), stearic acid (2), zinc oxide (5), sulfur (2), mercaptobenzothiazole (1), and phenyl-beta-naphthylamine (1), and sheeted and cured at 141°C. for one hour, has a tensile strength of 200 kgs./sq.cm. and an elongation at break of 400%. It will not swell in hot mineral oils, but does swell to less than 190% of the original volume when immersed in benzene. The compounded copolymer from 25 parts of cyanobutadiene and 50 parts of butadiene, when cured and immersed in Diesel oil at 70°C. for 7 days, shows only 9% swelling.

Vasel—U. S. Pat. 2,285,763—June 9, 1942. *Printer's Blanket.*

A printer's blanket comprises an underlayer made from plasticized polyvinyl chloride (Koroseal) or a polychloroprene (neoprene), and a surface layer of cellophane or similar smooth and hardfaced waterproof cellulosic sheet. The thickness of the cellophane sheet may be from 0.003 to 0.005 inch, while that of the underlayer may be from 0.004 to 0.007 inch. The neoprene or Koroseal underlayer may be applied in film or solution form.

Carter—U. S. Pat. 2,286,260—June 16, 1942. *Packing Material.*

A heat and oil-resistant packing is comprised of a large quantity of metal flake powder, such as lead, brass, copper, aluminum, etc., with neoprene powder, neoprene cement, and a non-drying oil acting as lubricant and plasticizer. The metal powder in form of granules 0.0032 inch in diameter is passed between pressure rolls to form flakes 0.0005 to 0.0001 inch thick. Such metal flakes (3) are mixed with neoprene powder (1), neoprene cement (1.5), and air-blown castor oil (3) and the mass molded into pencils, sticks, gaskets, etc., and cured at 220° F. for one hour.

Perkins—U. S. Pat. 2,286,505—June 16, 1942. *Polychloroprene Cements.* (Assigned to B. B. Chemical Co., Boston, Mass.).

Polychloroprene cements containing from 1 to 10% of polychloroprene are thickened by adding thereto from 1 to 10% of a low-viscosity ethyl cellulose. Preferably, the polychloroprene is first deodorized as described in U. S. Pat. 2,067,854 and then dissolved in benzene, toluene, trichloroethylene, ethyl or butyl acetate, etc. In the example given, the deodorized polychloroprene (125) is compounded with zinc oxide (6.5), magnesium oxide (6.3), and ethyl cellulose (6.3), and dissolved in a sufficient quantity of benzene to produce 100 gallons of cement. Comparative tests show that this cement has 30% greater bonding strength than the same cement without the ethyl cellulose. The cement may contain from 0.5 to 2.5 lbs. of polychloroprene for each gallon of the solution cement.

Murray—U. S. Pat. 2,286,636—June 16, 1942. *Insecticide.* (Assigned to U. S. Department of Agriculture).

An effective insecticide containing an alkaloid, such as nicotine, anabasine, conine, etc., is produced by mixing the alkaloid with natural rubber, polychloroprene, polybutadiene, Thiokol, polyvinyl chloride, etc., in finely divided form. The finely-divided natural or synthetic rubber is mixed with about 90% of the alkaloid. To obtain an insecticide dust, about 80% of hard rubber dust is used with 10% of a 90% nicotine and 10% of an oil. In a specific example, 320 grs. of a 200-mesh hard rubber dust or polychloroprene (or polybutadiene, etc.) are placed in a mixer and 40 cc. of a 99% alkaloid are slowly added. This mixture is then agitated in 40 cc. of cottonseed, soya bean, kerosene, Diesel, whale, herring or peanut oil. The mixture swells appreciably on the addition of the oil and should be kept in closed containers until ready to be used, when it should be admixed with a known diluent to obtain the proper concentration of the alkaloid. In a test, a sample of the mixture containing 70% of rubber dust and 30% of sulfur, which had been impregnated with 7.2% of nicotine, showed a nicotine content of 4.8% after nine days and 3.3% seven days later.

Davis—U. S. Pat. 2,287,766—June 30, 1942. *Rubber Flooring.* (Assigned to Boston Woven Hose & Rubber Co., Cambridge, Mass.).

An electrical conductor flooring having an electrical resistivity running up to millions ohms per cubic centimeter is comprised of natural rubber or neoprene with large quantities of graphite, with or without Thermax or Fumex carbon black. Thus, the flooring may consist of neoprene (100), magnesium oxide (4), zinc oxide (6), soya bean oil (10), stearic acid (0.5), paraffine wax (0.5), mineral oil (10), and graphite (200). This mixture can be applied as a backing on copper or brass wire cloth to form a layer 0.0625 inch thick.

Eckstein—U. S. Pat. 2,287,768—June 30, 1942. *Web Smoothing Method.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Del.).

In a method of handling and smoothing webs of cellophane, Pliofilm, metal foils, fabric, etc., having a thickness of about 0.00088 inch, the web is passed around a roll, which is surfaced with a soft, resilient sponge rubber, and through an arc of at least 90° to compensate for the irregularities in the web, whereby such film is smoothed out for further manipulative or mechanical operations, such as moisture-proof coatings and the like, without being placed under tension. The soft, resilient sponge rubber may be made from natural rubber or from neoprene. The facing of the sponge rubber is provided with longitudinal and circumferential grooves (⅜ inch. deep) which cut the surface thereof into squares, triangles, rhombuses, diamond shapes, etc., having an area of about 0.25 sq. yd.

Bacon et al—U. S. Pat. 2,287,773—June 30, 1942. *Rubber Derivatives.* (Assigned to Imperial Chemical Industries, Ltd., London, England).

The patent deals with the production of oil-resistant rubber derivatives by reacting natural rubber with dithiocyanogen, but it also discloses that such a derivative can be admixed with a quantity of neoprene to form a novel mixture which can be used as a diluent for natural or synthetic rubbers. Thus, a polychloroprene (100) is admixed with the reaction of rubber with dithiocyanogen (50) and the mixture compounded with magnesium oxide (10), rosin (5) zinc oxide (5), sulfur (1.25), and accelerator (0.25), which is cured at 141°C. for about one hour.

Bacon et al—U. S. Pat. 2,287,774—June 30, 1942. *Polychloroprene Derivatives.* (Assigned to Imperial Chemical Industries, Ltd., London, England).

The reaction of neoprene with dithiocyanogen produces derivatives having resistance to oils. To secure derivatives of still greater oil resistance, the reaction product (100) is compounded with channel black (35), rosin (5), magnesium oxide (10), antioxidant (2), zinc oxide (10), cottonseed oil (5), and sulfur (1), which is then sheeted and cured at 141° C. for one-half hour. The resulting material has only a 20% swelling capacity in Diesel oil, as compared with 55% for neoprene alone. In another example, the reaction product (100) is compounded with channel black (40), magnesium oxide (10), stearic acid (2), pine tar (4), sulfur (2), and an accelerator (0.25), and cured at 141°C. for one-half hour. This product shows a swelling capacity in Diesel oil of only 57% as compared with 300% for Buna N.

Carman—U. S. Pat. 2,287,780—June 30, 1942. *Draft Aprons.* (Assigned to Armstrong Cork Co., Lancaster, Pa.).

In the production of long draft aprons used in the Casablancs and Saco-Lowell Roth systems of drawing fibres, and which are commonly employed for supporting the fibres between adjacent pairs of drafting rolls, a tubular woven fabric of Nylon, rayon, silk, cotton, glass fibres, etc., is used, this fabric being impregnated with a rubber-like polymer. Inextensible radially, the tubularly or circularly woven fabric is impregnated with Perbunan or neoprene by passing it through a carbon tetrachloride solution of the polymer. After drying, it is drawn over a mandrel of about the same outside diameter as the inside diameter of the tube, and stretched thereon so as to eliminate any wrinkles and impart a partial tension to the warp and filler threads. The surface is then coated with either a layer consisting of Perbunan (100), pine tar (10), rosin (6), carbon black (25), zinc oxide (5), stearic acid (0.75), wax (0.5), sulfur (1.5), Altax (1.5), diphenyl guanadine (0.2), tricresyl phosphate (6), and whiting (28.5); or neoprene (100), resin (5), magnesium oxide (10), zinc oxide (20), cottonseed oil (3), antioxidant (2), stearic acid (1), carbon black (15), and factice (5). Either mixture is milled and extruded into a tube of 1⅛ inch inside diameter and 3/32 inch thick. After cooling, the tube is inflated and slipped over the fabric tube on the mandrel, covered with a wrapped wet tape, and cured at 300° F. for one half hour. It is then cooled and ground to the required diameter. The inside of the impregnated fabric tube may be coated with a film of the copolymer used or of Thiokol, Koroseal, etc.

Watermann et al—U. S. Pat. 2,288,982—July 7, 1942. *Extruding Polybutadienes.* (Assigned to Shell Development Co., San Francisco, Cal.).

An improvement over U. S. Patent 2,198,927 for producing threads, tapes, etc., from polybutadiene products. The improvement comprises the "wet spinning" of the polybutadiene by employing certain combinations of polybutadiene solvents and coagulating liquids, and in effecting the coagulation under certain definite conditions. The process consists mainly of extruding the polybutadiene solution into a coagulant liquid—kept at 60° to 160°C.—containing the desired coagulant. More specifically, the solution of the polymer is spun vertically into the coagulating liquid, whereby coagulation is effected, while the extruded thread is suspended vertically downward into the coagulant, after which it is passed under a guide and withdrawn from the bath, either vertically upward or upwardly inclined. A coagulating device in the form of a "V" or "U"-shaped tube is employed in the method. The coagulant is passed through the device either concurrent with or counter-current to the motion of the extruded filament. This method makes possible the production of threads at a speed of 60 to 160 meters per minute. The polymerized material may consist of butadiene or interpolymers thereof wtih vinyl chloride, vinyl acetate, chloroprene, styrene, methacrylic acid, etc., plasticized with dibutyl phthalate, tricresyl phosphate, etc., up to 20%. The solvent used may be benzene, paracymene, cyclohexane, cyclohexene, hexachloroethane, dioxane, dimethyl dioxane, benzyl ethyl alcohol, alkylated quinoline, morpholine, etc. The following may be used as coagulants: (1) lauryl alcohol, benzyl alcohol, cyclohexanol, glycerol, benzaldehyde, acetophenone, diacetone alcohol, etc.; or (2) aniline, methyl aniline, ethanolamines, cyclohexylamine, etc.; or (3) acetic, benzoic, cinnamic, malonic, salicylic, glutaric, lactic, tartaric, phthalic, benzene sulfonic or ethionic acids. The preferred solvents are dioxane, morpholine, quinoline, and alkyl quinoline. With dioxane or morpholine as the solvent, the coagulant may be acetic acid, phenyl hydrazene, diethylamine, 20% aqueous benzene sulfonic acid, nitro-benzene, orthophenylenediamine hydrochloride. In a specific example, a sodium butadiene rubber in form of 10% benzene solution is extruded into ethyl alcohol or dioxane at a speed of 5 to 10 meters per second.

Brennan—U. S. Pat. 2,290,163—July 21, 1942. *Electrolytic Device.*

An electrolytic device consists of an open end container of metal foil, such as aluminum, 0.005 inch thick, and a closure or plug made from natural or synthetic rubber at one end. An electrolytic cell is provided with terminals and electrodes. The terminals are passed through the resilient rubber plug and the electrodes inserted into the aluminum tube. The plug is next inserted into one end of the tube and an endless clamping ring is positioned around the aluminum tube adjacent to the end in which the synthetic rubber plug has been inserted. The clamping ring is then deformed inwardly into sealing engagement with the plug of synthetic rubber and the latter compressed into sealing engagement with the terminal of the cell. The type of synthetic rubber used is not specified.

Nugent—U. S. Pat. 2,290,204—July 21, 1942. *Shoe Manufacture.* (Assigned to B. B. Chemical Co., Boston, Mass.).

In a method of making shoes having an upper of polyvinyl chloride or acetate, or polyvinyl acetal, and containing a quantity of dibutyl sebacate, dibutyl cellosolve phthalate, etc., as plasticizer, the upper is shaped on the last. A cement of chlorinated rubber—such as a 10 to 20% solution in equal parts of toluene and methyl ethyl ketone, to which may be added an equal quantity of vinyl resin—is applied to the inner surface of the overlasted marginal portions of the upper and allowed to dry into tacky condition. A solution of polychloroprene is next applied over the chlorinated rubber coating and to the adjacent lasting marginal portions of the insole. The marginal portions of the upper are then pressed onto the marginal portions of the insole, thereby effecting a permanent and lasting adherence of the upper to the insole. The neoprene cement may consist of plastic polychloroprene (900), rosin (45), magnesium oxide (90), zinc oxide (45), sulfur (27), phenyl-beta-naphthylamine (9) and accelerator (12) dissolved in benzene (1690) and trichlorethylene (2850).

Nugent—U. S. Pat. 2,290,205—July 21, 1942. *Attaching Soles to Shoes.* (Assigned to B. B. Chemical Co., Boston, Mass.).

In a method of attaching soles to the bottom of shoes having an upper of vinyl resin (as described in U. S. Pat. 2,290,204), the overlasted portion of the vinyl resin upper is roughened and coated with a 15 to 20% solution of chlorinated rubber containing an equal quantity of vinyl resin. After drying, a

solution of neoprene cement (described in U. S. Pat. 2,290,204) is applied over the chlorinated rubber coating and also to the face of the sole to be attached. When these coatings are tacky, the sole is pressed over the coated shoe bottom, thereby effecting a permanent attachment of the sole to the shoe.

Thomas—U. S. Pat. 2,290,392—July 21, 1942. *Waxy Products.* (Assigned to Lummus Co., New York, N. Y.).

A product which is particularly suitable for rendering paper, leather, cellophane films, etc., moisture-proof is composed of paraffine wax, or carnauba, ceresin, montan or ozokerite waxes, petrolatum, etc., blended with 5 to 15% of Buna rubber. Thus, a wax, having a melting point of 127° to 140°F., is melted and Buna, in the form of non-hardenable polybutadiene dissolved in benzene, gasoline, naphtha, etc., is admixed therewith. The mixture is then homogenized (as described in U. S. Pat. 2,042,880) while applying a vacuum so as to remove the volatile solvent, thereby obtaining a waxy mixture having the same melting point as that of the wax used. It is stated that when the wax used is crystalline, it will be converted into amorphous form by the Buna rubber.

Slack—U. S. Pat. 2,291,112—July 28, 1942. *Pivoted Joint.* (Assigned to Chrysler Corp., Highland Park, Mich.).

In a joint for automobile wheel suspension, such as a front steerable wheel which is continuously in contact with a lubricant, a pair of movable members is provided one of which is threaded and is partly disposed angularly to be operatively connected with the other member, these two members being in rotatable threaded engagement and being connected with a bushing. A portion of the threaded member is spaced from the bushing and is normally exposed. A neoprene sleeve-like member acts as a resilient sealing element and grips the bushing and one of the movable members to bridge the normally exposed threaded portion, the neoprene sleeve being torsionally stressed in response to the relative movement of the moving members of the joint. This sealing element is preferably in the form of an annular sleeve which is sufficiently flexible so that it grips the parts of the joint, thus preventing the escape of the lubricant.

Habgood et al—U. S. Pat. 2,292,441—August 11, 1942. *Impregnated Fibres.* (Assigned to Imperial Chemical Industries, Ltd., London, England).

Fabrics are coated with a polyethylene containing small quantities of a synthetic rubber to form a plastic mass which is calendered onto the fabric. The rubber may be polybutadiene, polychloroprene, and interpolymers thereof, or Thiokol, etc., and is used in quantities from 5 to 30% of the plastic polyethylene. The coating material may consist of a polyethylene of molecular weight from 1,500 to 20,000 (75), polychloroprene or natural rubber (5), and polysulfide plastic (5); or it may consist of the polyethylene with 5% of polychloroprene. The composition is calendered onto a cotton, wool, silk, etc., fabric by passing the fabric between the nips of the calendering rolls, kept at 80° C. (top and bottom rolls), and 105° to 110°C. (middle roll). The fabric is preferably preheated before being introduced in the calender rolls and the coated sheet may be given a heat treatment at 120°C.

Mitchell—U. S. Pat. 2,293,266—August 18, 1942. *Chemical Apparatus.* (Assigned to Imperial Chemical Industries, Ltd., London, England).

An apparatus for the production and storage of fluorine, etc., is constructed with a packing, insulating, and/or sealing material obtained by blending natural or a synthetic rubber with hydrogen fluoride or an alkali metal polyfluoride. The treatment can be carried at 10° to 70°C. for a period of time varying from 1 to 10 hours. In the specific example given, an apparatus for producing fluorine electrolytically is provided with a packing and an insulating seal of neoprene for the purpose of insulating the anode and rendering it fluid tight. A mixture of anhydrous hydrogen fluoride (70) and potassium polyfluoride (30) is placed in the apparatus to fill it one half. It is then heated under a reflux in the cell for 5 hours, whereby the neoprene seal is rendered resistant to the hydrolysis products resulting from the electrolysis of a fluoride used for obtaining the fluorine.

Bergenthun et al—U. S. Pat. 2,294,826—September 1, 1942. *Textile Treatment.*

The adhesion between natural or synthetic rubber and tire cord is enhanced by first treating the fibres with a trioxy benzol and then bonding the rubber thereto. The rubber may be an interpolymer of butadiene with styrene. In the example given, cords of artificial silk to be used in the manufacture of tire carcass are impregnated with a 2% aqueous solution of pyrogallol, are centrifuged to remove excess liquid and dried. The treated cords are formed into a weftless fabric in any convenient manner. Several layers of such fabric are joined to form a multi-ply carcass. A tread layer from Buna S is then joined and vulcanized thereto to bond the synthetic rubber to the fibres inseparably.

Hamilton—U. S. Pat. 2,294,845—September 1, 1942. *Neoprene Products.* (Assigned to Callender Cable & Construction Co., Ltd., London, England).

In the compounding of neoprene with softeners, fillers, and curing ingredients, any softeners and fillers may be replaced wholly or in part with 25 to 50% of shellac. To compound the neoprene, magnesium oxide is first milled with the polychloroprene, after which the softeners are added. When the mixture has cooled somewhat, the required quantity of shellac is incorporated. In one example for preparing an electrical insulating material having a resistance of 10^{12} ohms at 20°C., the composition consists of neoprene (200), shellac (25), magnesium oxide (10), talc (150), and zinc oxide (3). A mixture for making a cellular product consists of neoprene (200), shellac (20), magnesium oxide (10), and zinc oxide (3). A blowing agent may be incorporated or the mixture may be blown with inert gas under pressure.

Lunsford—U. S. Pat. 2,294,919—September 8, 1942. *Cable Insulation.*

An electric cable is comprised of the conducting metal core and three co-axial covering layers applied over the core. Each of these layers consists of alternating helically wound strips of synthetic resin (having high dielectric properties) or synthetic lastics. The outermost layer overlies radially the strip in the innermost, and the strip in the intermediate layer, which lies radially between the other two strips, extends longitudinally beyond the edge of the other strips. All of these layers are bonded together through their contact surfaces. The synthetic resin may be a phenol-aldehyde resin, polyvinyl acetal, etc.; the synthetic lastic may be polybutadiene, polybutene, plasticized polyvinyl chloride, Thiokol, neoprene, etc. The layer nearest the conductor will have high electrical characteristics but poor mechanical properties, while the next layer has reduced electrical property but increased mechanical resistance. The outermost layer must have high mechanical resistance, thereby obtaining an optimum gradient of electrical properties nearest the conductor and best mechanical properties at the surface of the insulation.

(To Be Continued)

BACK THE ATTACK

BUY WAR BONDS AND STAMPS

Editorials

Post-War Supplies

IT becomes more and more apparent as the production of synthetic rubber increases under the government program that the post-war period must bring international collaboration, particularly between America and Great Britain, on the general subject of rubber supply. There are those in this country who contend that never again will crude rubber be absolutely essential to the manufacturing industry, basing their belief on the hope that copolymers will be improved to the point where they can match the natural product property for property, while others claim that the synthetics will practically fade from the market, except as specialty rubbers, just as soon as natural rubber is again available in sufficient quantity—from any source.

There is no question but that this controversy is receiving attention in official quarters. The rapid growth of the synthetic rubber industry, despite the urgent need for the product at this stage of global warfare, has many British plantation interests considerably disturbed. They do not argue the fact that rubber is almost strategic commodity number one or that the United States was completely shut off from a source of supply in an amazingly short time, but such admittances bring little comfort to the shareholders of British rubber plantations.

According to well-informed sources, conferences have been held in London between American and British officials to feel out the attitudes of the respective governments. Some of the officials at these conferences are reported to have expressed the belief that an international agreement of some kind can probably be drawn up which would cover the world's production of rubber—both natural and synthetic. Such an agreement, possibly similar to the restriction scheme in effect before the current world conflict, would of course have to cover distribution and, possibly, price. The possibility of such an agreement naturally takes in a tremendous amount of international cooperation never hitherto recorded by history.

That the American and British governments can amicably handle the problem of rubber supplies during wartime is currently being demonstrated. It is no secret that this government has agreed to supply England with considerable supplies of synthetic rubber to fill out supplies of crude rubber received by that country from Ceylon, India and Africa. In like wise, England has been reforwarding some crude rubber, presumably secured from Ceylon, to the United States to bulk up the dwindling stockpile in this country.

Despite all of the difficulties involved in a postwar agreement on total rubber supplies, there is sufficient international comfort in it to warrant its trial. The "how" and the "when" are of course questions that only time can answer.

The Tire Situation

POLLED for their views on the current tire situation, Akron executives were practically unanimous in the opinion that drastic conservation steps must be taken immediately if a tire crisis in the early future was to be avoided. Although Rubber Director Dewey denied that any such crisis would occur if motorists in general carefully observed current conservation measures and mileage restrictions, the apparent danger was emphasized by Sparks Bonnett, tire rationing chief for OPA, when he revealed that there were only 4,200,000 tire units on hand on September 1 to meet a demand for 9,000,000 tires for the fourth quarter of the year. This means that the 5,000,000 all-synthetic tires scheduled for production to meet essential civilian demand this year are badly needed. We hope that they roll off the production lines fast enough and soon enough.

CURRENT NEWS OF THE MONTH

PROBLEMS SHIFT FROM RAW MATERIALS TO MANPOWER AND TRADE FACILITIES

AUTHORIZATION for the tire manufacturing industry to expend $70,000,000 for the expansion of production facilities, an industry warning that the tire situation may again become critical in the next few months, distinct indications of growing manpower shortages, a threat that the government may enter the tire manufacturing field, and still further expansion of the rayon tire cord program—these were the highlights of the past thirty days in the rubber industry. It is now quite evident that the problems of the industry have completely swung from that of sufficient raw material supply to those of manpower and production facilities. The synthetic rubber program, insofar as productive capacity is concerned, is rapidly nearing completion. Technical problems must now be solved.

On September 24, Rubber Director Bradley Dewey announced that the program for new facilities in the tire manufacturing industry, needed to meet the government program for at least 30,000,000 tires for essential civilian use next year, had been reduced from its original contemplated total of $95,000,000 to less than $70,000,000, and that it now calls for the construction of only two relatively small plants.

The two plants referred to by the Rubber Director are believed to cover a new plant for the manufacture of farm tractor tires to be erected in Alabama by Goodyear and a tire and tube plant at Waco, Texas, by General Tire. The latter plant will cost $3,750,000, it has been reported, and will be constructed by General Tire with its own funds.

Reconverting Ordnance Plants

The return of at least two ordnance plants by the Army Ordnance Department to their original owners is also expected to ease the tire manufacturing picture. These plants are the Cumberland, Maryland, factory of Kelly-Springfield, and the Gillette factory of U. S. Rubber at Eau Claire, Wisconsin. Reconversion of both of these plants to tire manufacturing is already under way.

Despite labor shortages in the Akron and Los Angeles areas, plant expansions have been approved in those areas by Charles E. Wilson, executive vice-chairman of WPB. Approximately $8,000,000 will be spent in Akron and although this is a small percentage of the total expansion in terms of money, it was explained that the new installations would give Akron more than its share of the new production capacity. In fact, it is believed that Akron will produce about 50% of the synthetic rubber tires called for by the government program for 1944.

It is quite possible that some non-tire war contracts may be placed with other than Akron rubber manufacturers so that the rubber capital's skilled workers may be devoted almost exclusively to tire production.

Warn of Tire Crisis

A warning that developing shortages of cord fabric and inadequate manpower might bring a breakdown of motor transportation in the near future was voiced early this month by ranking tire executives in the Akron area. The consensus of opinion was that such a breakdown was inevitable unless immediate and drastic tire conservation measures are taken.

William O'Neil, president of General Tire, said "there is plenty of synthetic rubber, but not enough workers to convert it into tires"; John L. Collyer, president of Goodrich, pointed out that conversion of synthetic rubber into war products cannot be achieved "if adequate manpower and additional production capacities are not made available without delay"; Lee R. Jackson, executive vice-president of Firestone, predicted a "disruption of our war production effort" unless precautions are taken; E. J. Thomas, president of Goodyear, warned that "the situation can become very serious"; and J. P. Seiberling, president of Seiberling Rubber, said that "never before was the need for tire conservation so desperate."

Collyer Sums Up Problems

Mr. Collyer summed up the four general factors which combine to create the rubber industry's most difficult problems in a statement issued on September 21, as follows:

1. The extra man-hours required in the manufacture of heavy tires needed for military airplanes, trucks, combat vehicles and for civilian trucks, buses and farm tractors mean that the major share of the total tire building manpower available must be devoted to this job.

2. In addition, the rubber industry will be called upon to produce a minimum of 30,000,000 passenger car tires next year to guard against a passenger transportation breakdown on the home front. In order to do this, additional facilities must be provided.

3. The ratio of women to men workers in the rubber industry has sharply increased and will continue to do so, but due to the nature of some of the work involved, employment of women cannot solve the problem in the rubber industry to the extent that it is possible in some other industries.

4. Important technical problems in the manufacture of tires with the new synthetic rubber remain to be solved. This new material has been used for only a short time as a 100 per cent replacement for natural rubber in passenger car tires. And while great techni-

Rubber Director

Col. Bradley Dewey, who was named Acting Rubber Director by President Roosevelt following the resignation of William M. Jeffers early last month, was officially named Rubber Director to succeed Mr. Jeffers on September 15. The appointment was made by Donald M. Nelson, chairman of the War Production Board.

Shortly after his official appointment, Col. Dewey named L. D. Tompkins as Deputy Rubber Director. Mr. Tompkins will also continue in charge of the Operations Division of the office of the Rubber Director.

The appointment of three Assistant Rubber Directors was announced at the same time. These included Earl B. Babcock, in charge of product development and conversions; Frank Creedon, in charge of construction; and Edward R. Gilliland, in charge of research and development.

Like the new Rubber Director, the new Deputy Rubber Director and the Assistant Rubber Directors have all been associated with the Office of the Rubber Director since 1942.

cal progress has been made, considerable work must still be done. This is particularly true of large size tires.

Dewey Refutes Claims

Rubber Director Dewey has sharply refuted the statements of the Akron tire executives with respect to pending shortages of cord fabric and inadequate manpower. He took the position that there need be no breakdown of the transportation system if the public, in general, will carefully follow conservation measures, because steps are now being taken to break the bottlenecks.

As an example, he said, arrangements are being made under which tire company-owned fabric mills will be relieved from the manufacture of products other than tire cord. In addition, he claimed, the tire manufacturers are being helped with their manpower problems and they are being urged to take advantage of all possible priorities available to them, regardless of the effect on less important business.

(EDITOR'S NOTE: Sparks Bonnett, chief of the tire rationing branch of OPA, told tire dealers at the convention of the National Association of Independent Tire Dealers in New York on October 13 that the nation's stockpile of tires was down to 4,200,000 units of all kinds on September 1, that last quarter demands exceeded 9,000,000 tires, and that motorists face a strictly curtailed tire-issuance program which may be as severe as that carried out in the first six months of 1942.)

It is known that leading members of the tire and rubber industry met with Rubber Director Dewey and Vice-Chairman Wilson of WPB on September 22 to discuss manpower conditions and production in the industry. Facts and figures relative to the general tire and rubber picture were discussed, but no decisions were taken at the meeting.

It is also known that the War Manpower Commission is studying plans for the draft deferment of 8 to 10 categories of rubber workers, including tire builders, bias cutters, calender, mill and Banbury operators, supervisors, rubber compounders, and others.

Hints at Plant Seizure

When asked to comment on the dark picture drawn by Akron tire executives, William M. Jeffers, former rubber director, said that it may become necessary for the government "to go into the manufacturing of tires and rubber goods generally" in order to insure the manufacture of acceptable tires at a fair price and at the same time to "do away with this continual bickering and knifing of the rubber program."

Asserting he held no brief for the rubber union, Mr. Jeffers declared that strikes and slowdowns in the industry were not the whole story. Other questions involved, he said, include intelligent supervision on the job, keeping machines in proper order and raw materials flowing to the men at the machines, the use of available manpower to produce tires, and the ending of hoarding labor in departments not engaged in tire production. He charged the tire manufacturers were too much concerned with their post-war positions and not enough with the job of winning the war.

A sharp denial that the government is even contemplating entering the tire business was quickly made by Rubber Director Dewey. In a formal statement, he said that "there are no plans to put the government into the tire business."

Order Additional Rayon Cord

Over protests of the special Senate committee investigating the war production program, headed by Senator Harry Truman of Missouri and more popularly known as the Truman Committee, the War Production Board on October 5 ordered a 41,000,000-pound expansion in the existing high tenacity rayon yarn production program to meet rayon cord requirements for the manufacture of synthetic rubber tires in 1944 and 1945. It supplemented this action by issuing mandatory directives to four large rayon producers which are already producing high tenacity yarns, ordering them to expand these facilities. Conversion of machines now working on semi-high tenacity yarns for military and industrial purposes was ordered in other cases. All facilities involved in the 41,000,000-pound expansion must be in place and operating at capacity by July 1, 1944.

This expansion, the third ordered by WPB in its effort to keep production of the high tenacity yarn abreast of the estimated needs of tire manufacturers for the next two years, increases the total rayon yarn production program for military and heavy-duty civilian tires to 235,000,000 pounds.

On August 25, WPB approved the second large expansion program for the production of rayon cord, the program at that time calling for the conversion of machinery to the production of 68,000,000 pounds a year of high tenacity yarn for use in tires and bringing to 160,000,000 pounds the increase in rayon cord authorized in connection with the tire program.

Roughly, 275,000,000 pounds of cotton tire cord are scheduled for production for use in synthetic tires during 1944. Actual rayon production for synthetic tires in 1944 is estimated at 144,000,000 pounds.

The WPB action on October 5 followed on the heels of sharp criticism from Senators Connally of Texas and Bankhead of Alabama in a stormy session of the Truman Committee on September 22. Contending that the government is helping to finance rayon expansion to the displacement of cotton, the southern senators assailed a WPB report asserting that there are inadequate supplies of both fibres. WPB Chairman Donald M. Nelson told the committee that the 1944 tire program "threatens to be seriously retarded" by inadequate supplies of both rayon and cotton cord.

"I believe that only by the most vigorous efforts will we be able to supply the enormous quantities necessary for the successful prosecution of the war," Mr. Nelson added in a letter to Chairman Truman, read into the committee record. Referring to a secret report by his technical consultants, Mr. Nelson said:

"One broad conclusion is inescapable—namely, that our problem from now on is not one of deciding whether to use rayon or cotton but rather of being able to provide a sufficient quantity of both rayon and cotton. We must have sufficient rayon for aircraft tires and fuel cells, for combat tires for Army vehicles and for heavy-duty tires for the military and inter-city truck and bus fleets. We must have sufficient cotton for the tires on the jeeps and other military equipment, for farm trucks and tractors, and for many other highly essential purposes, as well as for the millions of passenger cars and small trucks that enable us to attain our war production goals."

Truman Committee Investigation

The Truman Committee began an investigation months ago after southern senators complained that cotton was being discriminated against. On July 16 it issued a special report urging that construction of additional facilities for the manufacture of rayon for tire cords be delayed until further tests have disclosed the relative value of cotton and rayon for this purpose and criticizing what the committee termed the "War Department predilection for rayon," declaring that "certain officials of the War Department, who have had much to do with these tests, came to the department from companies which are among those which for several years have advocated the use of rayon cord." The report charged that the War Department had made its original decision in favor

Nitrogen for Tires

Experiments are now being conducted by industrial gas producers with nitrogen as a substitute for air in filling tires. Such experiments by tire manufacturers and at least one producer of industrial gases are reported to have indicated that nitrogen escapes less easily from the tube and that the gas is less wearing on the tire than air. While these experiments have been restricted to truck tires, it is believed in some quarters that nitrogen might be feasible for inflating passenger car tires as well. A nominal service charge might be levied at the filling station.

of rayon cord "without the benefit of any adequate tests or scientific evidence."

When this report was called to the attention of the ORD, that office pointed out that experts of the Army, the industry, and of the ORD disagreed with the findings of the committee.

Meanwhile, it is stated in the trade that rayon is stronger per unit of weight than cotton. Less of it can be used to perform the same task, it is said, as the synthetic fibre checks the stretch of the tire cord and provides greater structural strength, permitting the construction of a thinner tire. Government research men, however, are devoting considerable study to the situation.

The Southern Regional Laboratory in New Orleans, one of four regional laboratories operated by the Department of Agriculture, recently sent representatives to Akron tire manufacturers to explore the problem of developing cotton fabrics to compete with the synthetic newcomers. The National Cotton Council is also directing its attention to this problem and the rubber companies themselves, many of which operate their own cotton mills, are also pushing research programs looking toward the strengthening of cotton fabrics. It is stated that, whereas rayon, when it becomes hot and dry, loses 15% of its strength, cotton loses 50%.

Mills Named in Directive

The four mills named in the WPB directive of October 5, with the amount of additional capacity they must develop, are: E. I. du Pont de Nemours & Co., Wilmington, Del., 2,000,000 pounds; American Enka Corp., New York City, 2,000,000 pounds; American Viscose Corp., Wilmington, Del., 28,000,000 pounds; and Industrial Rayon Corp., Cleveland, Ohio, 9,000,000 pounds. Two companies—American Viscose and Industrial Rayon—also were ordered to establish facilities for weaving tire fabrics from the yarns to be produced.

Work is currently under way upon an expansion of the Front Royal, Va., plant of American Viscose Corp. to provide facilities for at least doubling the production of the viscose rayon tire cord yarn manufactured there. The expansion will be completed, it is expected, in the latter part of 1944. Construction of this plant was commenced in 1937 and production was begun in 1940. Approximately one-half of the plant's current output, or about 25,000,000 pounds annually, consists of high tenacity rayon cord yarn which is going to the military forces for use in tires.

The WPB directive followed closely the start of construction of expanded facilities at the Industrial Rayon Corporation's Painesville, Ohio, plant, where 22,000,000 pounds annually of rayon tire yarn, cord, and fabric are to be produced in accordance with an earlier directive. The company's Cleveland plant is now nearing completion of its conversion program whereby its entire production of regular textile yarn has been replaced with 11,000,000 pounds of high tenacity rayon for tires. Twisting, warping, and weaving equipment are being added for the manufacture of tire cord and fabric. This conversion was ordered by WPB late last year and the new directive brings the total yarn production of the Cleveland plant to 20,000,000 pounds.

In commenting on the new order, Hiram S. Rivitz, president of Industrial Rayon, said: "This action will bring the company's tire yarn capacity to 42,000,000 pounds of a total capacity of nearly 70,000,000 pounds. This additional rayon production will all be twisted into cord for shipment to rubber companies for the direct manufacture of tires."

WPB indicates that the latest rayon tire yarn program will reduce civilian yarn in 1944 supplies 3%, but textile market factors are of the opinion that the reduction may prove much more severe.

RESTRICTIONS CONSIDERABLY EASED ON THE USE OF RUBBER CEMENT

Practically all restrictions on the use of rubber cement which does not contain any crude rubber or natural latex were removed by the War Production Board on September 27. The easing of restrictions was accomplished by a revision of Amendment No. 4 to Rubber Order R-1. (The original amendment was issued on September 7 and was discussed in our previous issue.)

The revised amendment specifically exempts from all certification requirements monthly deliveries of such cement in lots of 12 gallons or less for permitted repair operations. This is expected to primarily be of benefit to small shoe repairers. Shoe manufacturing operations for which crude rubber and natural latex cement is permitted remain unchanged in the revised amendment.

Additional government regulations, affecting production and sales, announced in recent weeks follow:

MECHANICAL GOODS

Uniform dollars-and-cents ceilings were given to neoprene conveyor belting and certain types of synthetic rubber hose produced for the aircraft and railroad industries by OPA on September 26. The new ceilings are contained in Amendment No. 14 to M.P.R. 149 (Mechanical Rubber Goods) and went into effect on October 1.

Only those types of aircraft hose and low pressure hose assemblies that can meet Army-Navy Aeronautical or Army Air Force specifications are brought under these ceilings. Likewise, in the case of railroad hose, only hose meeting American Association of Railroad specifications are given specific maximum prices. These specifications were in general use in the industry prior to the issuance of the amendment embodying these changes.

The ceilings apply to all Grade I conveyor belting made in whole or in part of neoprene which is made with either a 28 or a 32-ounce duck in four, five or six plies. Grade I belting is defined as having a minimum range of 1,700 or 2,200 pounds per square inch in the tensile strength of the covers and a minimum range of 16 to 19 pounds per square inch in the friction between plies.

DRUG SUNDRIES

In a double-actioned regulation — Amendment No. 11 to M.P.R. 300 (Maximum Manufacturers' Prices for Rubber Drug Sundries)—OPA reduced manufacturers' ceiling prices on neoprene bulb goods, surgical tubing and catheters, and established identical maximum prices for rubber drug sundries whether made of natural rubber or certain types of synthetic rubber. The regulation, issued on September 26, became effective October 1.

The order provides that sundries which are the same as those dealt in by the manufacturer on December 1, 1943, except for changes necessitated by the wartime substitution of GR-S or GR-I for natural rubber, shall have the same ceiling prices as sundries made of natural rubber. This action was taken in view of the fact that the prices of these synthetics are on a level equivalent to the natural product.

Reductions from 3 to 10% as compared to previous prices were achieved on surgical tubing and catheters by the new regulation, while a lowering in manufacturers' prices for bulb goods will result in an average reduction of about 5c per item at the retail level. The amendment also provides that differentiation between Consumer Grade I and Grade II hot water bottles and combination syringes no longer is dependent upon color.

At the same time OPA established a new pricing method for use by dental, surgical and hospital supply houses on sales of rubber drug sundries with the issuance of Amendment No. 9 to M.P.R. 301 (Retail and Wholesale Prices for Rubber Drug Sundries). This regulation is intended to hold prices in line with those prevailing in December, 1941. It changes former pricing provisions for sales of all sundries other than "Victory" line items.

HEELS AND SOLES

A separate maximum price regulation covering rubber heels and soles when sold to shoe manufacturers for use in shoes for civilian use was issued by OPA on October 12. The new order—MPR 477—applies to heels and soles

made in whole or in part of either natural or synthetic rubber when sold in the "shoe factory trade." Ceiling prices set by the order are in dollars and cents for standardized heels and soles which comprise the bulk of sales. The ceilings are at the same level as they were under the G.M.P.R. The order is effective November 1.

Provision of specific prices for soles, corded heels, and four grades of rubber heels reflects the usual practice in the industry. Minimum quality specifications are given for each grade, those for soles and for the lowest grade heels being the standards set in Rubber Order R-1. Maximum prices for heels and soles which are not given specific ceiling prices in the new regulation are established by a technique similar to that employed in G.M.P.R.

There is no automatic pricing formula established in the order for new types of soles and heels. For these, manufacturers must obtain specific authorization from OPA for a price that is in line with the level of maximum prices established by the regulation.

MISCELLANEOUS ORDERS

Several changes in ceiling prices on various brands of bicycle tires and tubes, particularly those of the Pennsylvania Rubber Co. and the Mansfield Tire & Rubber Co., are covered in Amendment No. 1 to M.P.R. 435 (New Bicycle Tires and Tubes), issued by OPA on September 7. The amendment also makes a few minor changes in the regulation.

A slight change in the method of determining the price for the predesigned camelback made by the Denman Tire & Rubber Co. for the Webster Rubber Co. is contained in Amendment No. 5 to M.P.R. 131 (Camelback). The amendment was issued by OPA on September 10.

Provisions restricting the use of rubber in the manufacture of hand trucks and other handling equipment have been removed from General Limitation Order L-11, WPB announced on September 6. However, the amount, type and use of rubber is still governed by Rubber Order R-1, the effect of the change being to simplify procedure for permitting the use of rubber tires where needed on hand trucks and equipment of similar nature.

Polyethylene, largely used in the manufacture of insulated wire and cable, and polyethylene scrap were placed under allocation by WPB on September 29 with the issuance of Allocation Order M-348, effective October 1. No person may now use, deliver or accept polyethylene except as specifically authorized, with some exceptions being allowed in the regulation.

Allocations of pure benzol, urgently needed for the aviation gas and synthetic rubber programs, will be tightened considerably. It is understood that as of November 1, pure benzol will not be allocated for any solvent uses other than for rubber solvent, rubber adhesive, extraction oil and dewaxing solvents. Other industrial users will have to turn to motor benzol in most cases.

RUBBER-LIKE MATERIALS ARE PLACED UNDER PRICE CONTROL BY OPA

Rubber-like materials, sometimes referred to as substitute rubber, in the form of raw material has been brought under coverage of M.P.R. 406 (Plastic and Synthetic Resins) by Amendment No. 2 to that regulation, issued by OPA on September 21. Under that regulation, it was explained, rubber-like materials are given maximum prices that are in line with those of March, 1942, thus helping to hold the line on ceiling prices of articles in which they are used

As defined in the amendment, substitute rubbers include "any substance made in whole or in part by a chemical process or from natural gums, resins or oils which in physical properties sufficiently resembles natural or synthetic rubber to replace either of them for particular uses, including uses where only some and not all of the physical characteristics of natural or synthetic rubber are needed, and which serves the same use as natural or synthetic rubber in the particular application in which it is applied." Such substances are covered whether they are in sheets, blocks or other shapes or forms.

The order specifies that substitute rubbers do not include finished objects or parts that have been obtained by further processing or fabrication of materials described; vulcanized vegetable oils; chemical derivatives of crude rubber or crude rubber latex; or synthetic rubber as defined in this and other regulations.

There are about a dozen types of so-called substitute rubbers which are in commercial production or which show promise of being used on a commercial scale, and others may be developed. They are used in products that are going on the civilian market, and whose prices as finished articles are covered by other regulations. Thus price control of the raw material is important in order to prevent pressure on the ceiling prices of the finished articles.

Price control of the substitute rubber in its raw form is more practicable under the existing regulation for synthetic resins and plastic materials than under the more general provisions of the General Maximum Price Regulation to which substitute rubber was subject before the new action. Maximum Price Regulation 406 has provisions that apply specifically to the pricing of materials developed since the March, 1942, base date of the General Maximum Price Regulation, and contains features which make unnecessary the issuance of a separate regulation for substitute rubber.

Institute Plant Completed

The third and final copolymer unit at the government plant in Institute, West Virginia, operated by U. S. Rubber, has been completed, according to the Blaw-Knox Co., of Pittsburgh, which installed all of the polymerizing equipment at the plant.

Work on the Institute plant, which now has a productive capacity of 90,000 tons of GR-S per year, was started in April, 1942, and the first of the 30,000-ton units was placed in operation within eleven months. The total plant was completed in seventeen months.

The Blaw-Knox statement pointed out that the yield from the Institute plant would equal that of a 270,000-acre plantation with 24,000,000 trees. A plantation of this size, it was said, would cost about $80,000,000 and would require five years to get into maximum production.

More Alcohol Required

The hopes of the liquor industry for a resumption before the end of the year of the distillation of alcohol for beverage purposes were dispelled on September 15, when WPB ruled against any such resumption. The ruling was based on an unexpected demand for an extra 40,000,000 gallons of industrial alcohol for war use. The request for the additional alcohol was made by the Rubber Director's office.

In explaining his request for an increased alcohol supply for the synthetic rubber program, Rubber Director Dewey attributed it to the necessity of producing more high-octane aviation gasoline. Or, in other words, with additional supplies of alcohol available it will be possible to manufacture more butadiene from this source and less from butylene, thus making larger supplies of the latter available to the aviation gasoline program.

Col. Dewey made it plain that the additional alcohol does not mean the increased production of butadiene, but merely that greater quantities of it will be made from industrial alcohol. It has been estimated that the 40,000,000 extra gallons which the synthetic rubber program will require this year represents about 20% of the volume originally sought by the Office of the Rubber Director.

Synthetic Rubber Soles

According to an announcement by WPB on September 25, synthetic rubber, rubber-like materials, and plastics will be used to help relieve this winter's leather shoe sole shortage. The output of rubber soles will be used on rationed shoes and for shoe repair. Available plastic soles will be used for rationed shoes only.

SCHOOLS FOR RUBBER TAPPERS BEING SET UP IN WESTERN HEMISPHERE

The latest development in the battle for crude rubber in the Western Hemisphere, according to the Office of the Coordinator for Inter-American Affairs, is the establishment of schools for rubber tappers. These schools are being set up with the aid of the Rubber Development Corporation not only to boost wartime production of badly-needed crude rubber, but to conserve the rubber-bearing trees for continued use after the war.

Classes in these schools, located in several Latin-American strategic centers, average about 20 pupils. The course runs about three weeks and the "graduates" are then sent out to train other tappers. Production possible from a trained tapper is estimated at about three times that from traditional methods of hacking away with machetes.

The rubber tapping schools are being set up under the direction of George L. Seeley of the Rubber Development Corp. in cooperation with the countries concerned. Courses are now being given in Panama, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Mexico. The methods taught are primarily for the tapping of castilloa trees which, Mr. Seeley believes, should be tapped every six months. Students are instructed in the use of a special knife with a "U" blade on one side and a fin blade on the other, the incision being made straight up the side of the tree.

A second phase of the better tapping methods concerns the manner in which the tapper climbs the castilloa tree. In the past tappers have not climbed these trees at all, thus failing to get such rubber that might be obtained from the upper trunk. They are now taught to use rope belts slung around the tree and around special seats as a means of hoisting themselves up the trees. They climb with their bare feet, leaving hands free for knife wielding. Students are paid while learning and, of course, continue to be paid later when acting as instructors. An illustrated booklet in Spanish covering the improved tapping method has been published by the Government of Panama in the interests of the program.

Tapping of Cryptostegia

According to reports from Haiti, tapping of the cryptostegia vine has been started on a substantial scale by a new mass-production method involving the use of tens of thousands of half-pint milk bottles. A special tapping stick has been developed which, together with a clamp, is used to group about 10 stems of cryptostegia together and thus concentrates the flow of latex from these stems so that it runs into the milk bottles. Workers circulate about, tending to the concentrating of stems, and collect the milk bottles as soon as they are full.

The cryptostegia program in Haiti, which is under the direction of Shada, calls for the cultivation of 100,000 acres. Although there are several conflicting reports, it is understood that approximately 32,000 acres are now under cultivation and that 85,000 acres will be planted by the end of the year. Tapping has begun on 1,500 acres by the new method and the schedule calls for the tapping of 8,000 to 10,000 acres by the end of the year, 20,000 to 25,000 by the second quarter of 1944, and the entire acreage by the third quarter of 1944.

Approximately 3,000 tons of cryptostegia rubber is expected to be produced in Haiti in 1944, according to Thomas Fennell, president of Shada, and 12,000 tons per year is the eventual goal from the total planned acreage. Cryptostegia yields about 300 pounds per acre, although experiments currently indicate that special strains producing three times that amount are possible. The cryptostegia vines, when ready for tapping, are tapped about every other day.

Haiti also has some 6,000 acres of *Hevea brasiliensis* under cultivation, the eventual yield from which is expected to average about 1,000 pounds per acre. In all, Shada visualizes a total annual rubber production of approximately 25,000 tons, with this figure reached in about 5 or 6 years. About 1,800 acres are now devoted to nurseries and a 60-acre experiment station is maintained at Gonaives.

Other Hemisphere Developments

Progress in rubber collection efforts has also been made by other Latin American countries in recent weeks, some of which follow:

Brazil: New agreements concerning the production of rubber have been signed between the United States and Brazil. The payment of $2,750,000 to Brazil has been authorized, most of which will be used to send 16,000 workers into the Amazon Valley. The Workers Routing Commission has been created to supervise the migration of tappers into rubber-bearing areas, thus concentrating such migration under a single agency. The powers of the Brazilian Rubber Bank to finance rubber collections have been increased by government decree.

Panama: Under a special arrangement with the Panamanian Government, the Cuna tribe of Indians in the Bayano River region is now collecting wild rubber. The tribe resented efforts to send tappers into the region, which it considers its own special territory. After a conference with government officials, however, the tribe declared war on the Axis and began to collect the rubber. The rubber is brought to the headquarters of the Chicle Development Co. at El Llano. This company has agreed to set up a commissary or exchange where food and other goods will be available at cost in exchange for the rubber. Thirty-one cents a pound is paid for the rubber.

Ecuador: The El Oro Province is reported to be producing crude rubber in growing volume with the aid of new roads and trails. One new 30-mile trail is being built between Marcabeli and the railhead at Piedras. Most of the work is being done by volunteer labor. Machetes are being distributed to rubber tappers in this region for payment at the rate of 15 pounds of rubber for a machete.

Colombia: The first automobile tire in its history was produced in Colombia last month. The tire was manufactured from crude rubber collected in the country's jungles. Colombia, because of its fast developing system of highways, has become increasingly dependent upon motor transportation. In recent years more than 5,000 miles of motor highways have been built in the country, some of them cutting through and across towering peaks of the Andes.

New Source of Guayule

A small supply of crude rubber will be added to the dwindling stockpile of the United States as the result of a guayule harvesting project now being conducted by the Forest Service of the Department of Agriculture, in cooperation with the Rubber Reserve Co. The rubber is coming from a scattered stand of wild guayule in the Big Bend section of Southwestern Texas and while it will result in only a minute fraction of the country's needs, it will be more than welcome.

There was once a guayule mill at Marathon, Texas, but over a period of several years it processed all the shrub considered accessible and ceased operations in 1926. The critical shortage of natural rubber has caused the Government to survey remnants overlooked by the former operators, and second growth stands. Between 1,500 and 2,000 tons of shrub suitable for harvesting have been located.

A contract has been let for collection of the shrub, which is scattered over several hundred thousand acres of mesas and canyons in the remote Texas cow-country. Provisions have been made in the harvesting plans to leave sufficient guayule on the range to insure future reproduction of the plants. Shipment of the Texas shrub already has started to Salinas, California, where it will be processed.

Availability of Crude

According to a recent statement by John B. Ingle, assistant manager, Crude Rubber Division, Goodyear Tire & Rubber Co., Akron, approximately 180,000 tons of natural rubber a year are now available to the United Nations. Of this amount, he said, 110,000 tons were coming from Ceylon, 40,000 tons from the Western Hemisphere, and 30,000 tons from Africa. Africa, Mr. Ingle declared, has been split into zones, with the United States getting all of Liberia's production, estimated at 14,000 tons annually, and the British getting all of the rest.

TIRE AND TUBE INVENTORY CONTROL DIVIDED BETWEEN ORD AND OPA

Control of tire and tube inventories in the hands of dealers, formerly a function of the ORD, has been divided between that office and OPA through Amendment No. 5, issued October 11 and effective October 19, to Rubber Order R-1. The order retains inventory control in the ORD in connection with tires and tubes for bicycles and airplanes, pneumatic industrial tires and tubes, and solid industrial tires, except molded-on and pressed-on tires made from F grade tread stock, but indicates that inventory control of passenger car and motorcycle tires and tubes, truck, bus, and special purpose tires and tubes, farm tractor-implement tires, and solid truck-trailer tires will be under OPA.

October Tire Quotas

Reflecting the low level of new tire stocks throughout the country, OPA announced on September 29 an October quota which reduced by one-fifth the number of new passenger tires available for rationing. The October quota of Grade I tires is 645,050, compared with 829,659 for September.

The October quota, based on the allotment assigned for the month by the ORD, is in line with recent OPA action to curtail ration demand for new tires by raising mileage requirements. Effective October 1, only those car owners who need to drive 601 miles or more a month may qualify for new tires.

Eligibility for new tires was restricted on advice of the ORD that the country faces a shortage of new tires until synthetic tires can be produced in adequate quantity to replace the dwindling prewar stocks.

October quotas for other types of tires and for tubes remain virtually unchanged, except for farm tractor and implement tires which were reduced to 59,800 from 73,600 in September, due to seasonal decline in demand. The allotment of Grade III passenger and motorcycle tires is 648,800 as against 645,175 in September and the the October quota of 652,374 new tubes compares with 737,362 in September. Truck and bus tires and tubes amount to 416,613 and 361,660, respectively, and compare with 416,142 and 330,169 in September.

Amendments to Ration Order

Seven additional amendments to Ration Order 1A (Tires, Tubes, Recapping, and Camelback) have been issued by OPA since our last report, as follows:

Amendment No. 50, issued September 27 and effective October 1, permits automobile dealers to make use of their stocks of Grade III (used or recapped) tires or new tubes to equip, under certain specified conditions, used cars which they hold for sale, but they are prohibited from removing tires or tubes from their used cars held for resale unless the removal is for purposes of repair or recapping or unless the vehicle is to be scrapped.

Amendment No. 51, issued September 28 and effective October 2, removes used tractor and implement tires from rationing, to encourage the full use of supplies of farm service tires in vital food production.

Amendment No. 52, issued September 25 and effective October 1, restricts eligibility for new passenger tires (Grade I) to "C" book drivers with a mileage of 601 miles or more per month and automatically removes from eligibility all "B" drivers and some "C" book holders, these now being eligible only for used and recapped tires. Previously all car owners whose mileage totaled 241 or more miles per month could obtain ration certificates for Grade I tires—pre-war or new synthetic.

Amendment No. 53, issued October 7 and effective October 12, modifies the rationing regulation to simplify the applications of operators of government vehicles for tires and tubes. The amendment also provides that the Procurement Division of the Treasury Department may transfer tires or tubes to, or acquire tires from, any agency in the Federal Government; and that the Procurement Division, upon application to the OPA District Director, may obtain certificates authorizing the recapping of truck tires in its possession.

Amendment No. 54, issued and effective October 4, permits recappers of truck tires to acquire additional stocks of camelback sufficient to make up for reductions resulting from a recent reclassification of types of camelback in which Grade C recapping material was changed from "truck-type" to "passenger-type" camelback. The reclassification permitted the sale of recapping services with Grade C camelback without certificate. "Truck-type" recapping material was redefined to refer only to Grade A camelback, a high grade stock formerly used only to recap the larger size truck tires but now used for all truck sizes.

Amendment No. 55, issued October 8 and effective October 13, modifies rationing restrictions on eligibility for used passenger tires to permit passenger car owners who have been ineligible for tires to get Grade III tires if they have obtained a "special" ration for any purpose except furlough travel.

Amendment No. 56, issued September 30 and effective October 1, amends Ration Order 1A in the following respect: Section 1315.503 is amended by deleting the number "90" and inserting in lieu thereof the number "120".

Recapping Prices Changed

Maximum prices for recapping truck and bus tires in sizes smaller than 8.25-20 with Grade A camelback were established on September 20 by OPA through Amendment 6 to RPS 66 (Retreaded and Recapped Tires and Retreading and Recapping Services), as amended, which became effective September 24. The prices reflect a change from Grade C to Grade A camelback ordered by WPB for these smaller sizes of truck tires.

The result will be slightly higher ceiling prices for recapping with the better quality Grade A than with Grade C but the higher price will be more than offset by the substantial increase of mileage afforded. The price difference is based on the changed direct material cost.

As an example of the new schedule of prices, OPA cited the permissible charge for recapping a truck and bus tire, size 7.00-20, with a conventional tread, when the tire carcass is furnished by the purchaser. The ceiling price, using Grade C camelback, is $11.25; but for using Grade A camelback it is $11.80.

As a result of this amendment, the schedule now contains two tables of maximum prices for recapping truck and bus tires in all sizes. Table II-A applies when Grade A camelback is used and Table II applies when using Grade C or any rubber other than Grade A camelback.

Tire Recapping Order Amended

Through an amendment, issued September 18 and effective October 1, to General Limitation Order L-61 (Tire Retreading, Recapping, and Repair Equipment), the ORD no longer is authorizing additional recapping facilities, and production of such facilities is now confined to MRO and equipment for necessary replacements. The amendment also requires all manufacturers of full circle and sectional molds, matrices, curing rings, steam chambers or kettle curing devices to submit a list of their unfilled orders as of October 1. The purpose of requiring such lists from manufacturers is to enable the ORD to make a final review of its recapping equipment program as of that date and to ascertain just what the material requirements of the industry will be for the last quarter of this year.

Report on Synthetic Tires

The Indiana Department of Public Safety, after experimenting with synthetic rubber tires on state police cars since July 6, reported on September 28 that about one-third of the total required replacement within 1,500 miles of driving. According to the report, "heat generated by even slightly excessive driving speeds forms blisters and offers the chief difficulty."

Doubles Cotton Fabric Capacity

Goodyear Tire & Rubber Co. has let contracts for a $1,000,000 addition which will more than double the present capacity of its cotton fabric mill at Decatur, Alabama. Containing approximately 140,000 square feet of floor space, the addition is scheduled for completion in about six months. About 400 more persons will be employed at the Decatur mill when the one-story addition, linked to the present plant, is finished.

RECORD-BREAKING ATTENDANCE MARKS MEETING OF RUBBER DIVISION; GRAY AND GIBBONS HEAD DIVISION AS CHAIRMAN AND VICE-CHAIRMAN

The Fall Meeting of the Division of Rubber Chemistry, A.C.S., held at the Hotel Commodore in New York City, on October 5, 6 and 7, proved to be the most outstanding meeting ever held by the Division, registration reaching the record-breaking figure of 1,145. A total of 1,070 tickets were sold for the divisional banquet, a feature of every meeting. The unusually large attendance was generally attributed to the excellence of the papers presented, many of which touched on vital problems associated with the compounding and processing of GR-S. Complete abstracts of these papers were published in our September issue.

Highlights of the meeting, held by the Rubber Division only, all other divisions of the parent American Chemical Society having met in Pittsburgh last month, included the presentation of all of the scheduled 30 papers, election of officers, the banquet, and the unscheduled appearance of Rubber Director Bradley Dewey as the speaker at the banquet. Although all of the scheduled papers were given, it was stated that several of them will not be published in any of the technical journals because of military censorship.

Officers for 1943-44

Officers to head the Rubber Division for 1943-44, selected by letter ballot, were announced at the business meeting on Thursday, October 7. These are: *Chairman,* Harold Gray (Goodrich); *Vice-Chairman,* W. A. Gibbons (U. S. Rubber); *Secretary,* H. I. Cramer (Sharples Chemicals); *Treasurer,* C. W. Christensen (Monsanto); *Sergeant-at-Arms,* Bruce Silver (N. J. Zinc). Newly-elected directors included George S. Haslam (N. J. Zinc), Arthur Nellen (Lee Tire), and J. H. Doering (Ford Motor). Mr. Gray served as vice-chairman of the Division this past year, while Messrs. Cramer and Christensen, both of whom have done such excellent work in their respective positions for many years, were re-elected. The Teller Committee, reporting on the sealed ballots, included W. H. Cope (Vanderbilt), L. Venuto (Binney & Smith), and Fred Conover (Naugatuck Chemical).

It was announced during the business meeting that the Auditing Committee, headed by V. L. Smithers, of Akron, had reported that it found the books of the Division in excellent shape. Other than the announcement of the new officers and this committee's report, no new business was announced during the brief business session.

Dewey Reviews Situation

In his informal talk to the Division following the banquet on Wednesday, October 6, Rubber Director Dewey pointed out that the cooperative spirit now existing between competitive rubber manufacturers was a far cry from that which marked the early days of the Division. He pointed out that practically every new development achieved by any one company today generally is broadcast to the branch of the industry interested in such a development within a week to ten days.

Referring to the synthetic rubber program, Col. Dewey repeated the remarks he made at the A.C.S. general meeting in Pittsburgh last month to the effect that 30,000 tons of government rubber was produced during September and that a rate of approximately 70,000 tons a month will be achieved by December. He reiterated the general knowledge that good passenger car tires are being made of all-synthetic, but that the manufacture of heavy-duty bus and truck tires still called for some percentage of crude rubber. He termed all rubber chemists "trustees" of every pound of crude and synthetic rubber allocated to them for the production of military or essential civilian products.

Concerning the future of synthetic rubber in this country, Col. Dewey predicted that the American-made product will stand up on its own feet in the post-war period. He said that when the rubber technologists finish their job we will have not one standard type of GR-S, but a number of special synthetics, engineered for particular products, and predicted that at least six such specialty synthetic rubbers will be developed within the next year. According to the Rubber Director, the Russians now have at least seventeen types of synthetic rubber under production.

Tells of New Laboratories

Of special interest was Col. Dewey's announcement that the Office of Rubber Director was currently constructing two laboratories and a semi-commercial pilot plant in Akron. One of the laboratories will be used solely for evaluation purposes, with the results to be available to the entire industry, while the second will be used for development work instituted by the research division of the ORD. The semi-commercial pilot plant will primarily be used in the development of new copolymers, all of which will be given exhaustive tests. (EDITOR'S NOTE: It is understood that the foundation of the Akron laboratories has already been laid and the walls will be erected within the next few weeks. No choice of chemists to man the laboratory has yet been made.)

In concluding his address, the Rubber Director said that William M. Jeffers, head of the Union Pacific Railroad, whom he succeeded as rubber director, had done his job in that productive capacity for synthetic rubber was now practically completed, and from here on in it was up to the rubber technologists to continue to improve the quality of synthetic rubber products to the point where they matched or surpassed crude rubber in both physical and chemical properties. He summed it up in this manner: "Synthetic rubber is here to stay and you fellows are doing what no amount of bureaucracy can do."

Harold Gray
Chairman of Rubber Division

W. A. Gibbons
Vice-Chairman of Division

Opening Remarks by Blake

In formally opening the meeting on Wednesday morning, October 5, John T. Blake, director of research of the Simplex Wire & Cable Co., the retiring chairman of the Division, made a few introductory remarks. He stated that in his belief the supply of natural rubber is not coming back quickly, if at all, adding that its return to this country is far more dependent on international politics

than it is on any action of the rubber industry. Therefore, he said, synthetic rubber must be developed to the point "where the restoration of natural rubber is a matter of indifference," which, in his opinion, can and will be done.

Stating that the rubber industry is benefiting from the war, Dr. Blake explained that the industry has accomplished in approximately two years with new substances what it required over a hundred years to do with the natural product. He charged that the rubber industry had to a large extent reached its equilibrium three years ago, acceleration, antioxidants, reinforcing agents and other developments having obtained substantially their full stature, and then pointed out that the work on synthetic rubber has changed this status. For example, he said, vulcanization was a unique phenomenon applying only to rubber and sulfur, but a host of synthetic materials can now be vulcanized with a wide variety of reagents, and these new facts "must lead to a better understanding of this particular process."

Banquet Draws Big Crowd

As stated, the banquet held in the Grand Ballroom of the Commodore on Wednesday evening, October 6, attracted over 1,000 members and guests. In addition to the informal address of Rubber Director Dewey, an excellent variety of entertainment was presented.

The speaker's table at the banquet was graced with the presence of a number of outstanding personalities. These included Dr. Per K. Frolich, president of the American Chemical Society; O. B. Litvin, American representative of the Russian Rubber Commissar; Dr. Norman Grace, chief chemist of the Dunlop Tire & Rubber Goods Co.; J. C. Howard, chief chemist of the Kaufman Rubber Co.; Walter Murphy, editor of *Industrial & Engineering Chemistry;* D. H. Killeffer, contributing editor of the same journal; and A. H. Emory, of the A.C.S. business office. A number of others, including the directors of the Rubber Division, were also seated at the speaker's table.

It was generally agreed that the local committee in charge of arrangements had done a good job in connection with the meeting. This committee was headed by E. B. Curtis (Vanderbilt) as chairman, and included Charles R. Haynes (Binney & Smith), Walter J. Geldard (Naugatuck Chemical), Harry E. Outcault (St. Joseph Lead), John H. Ingmanson (now with the Whitney Blake Co.), B. B. Wilson (*India Rubber World*), and Peter P. Pinto (RUBBER AGE).

Firestone Buys Cotton Mill

Firestone Tire & Rubber Co., Akron, is reported to have purchased the Marlboro Cotton Mills of Bennettsville, S. C. This mill has been producing woven tire fabric and its acquisition by Firestone is in keeping with the company's expanding needs for such fabric.

INSULATED WIRE AND CABLE EMERGENCY SPECIFICATIONS

Committee E-10 on Standards of the American Society for Testing Materials has accepted two new emergency specifications covering insulated wire and cable (ES-33 and ES-34). They were accepted by the committee on August 13 following letter action.

The two standards were expedited by Committee D-11 on Rubber Products since a limitation order effective after August 15 would have prevented the use of crude rubber in the manufacture of insulation or jacket compound, and synthetic and reclaimed rubber has to replace crude rubber for these particular requirements. Earlier, Committee D-11 had developed emergency specifications for chloroprene sheath compound (ES-28 and ES-30) and at the June Annual Meeting there were approved new specifications for polyvinyl insulating compound (D-734). The new specifications which permit the use of GR-S are now available for industry guidance and performance references in WPB orders.

While other A.S.T.M. specifications are being continued as references in WPB Order R-1, they are for certain uses of the armed forces only. Commercial users and many land installations of Government forces will use the new specifications. Prompt development of these standards was handled through D-11's Subcommittee V on Insulated Wire and Cable headed by R. A. Schatzel, of General Cable.

In each specification the insulation must have a minimum tensile strength of 700 psi. and elongation at rupture of 300 min. The performance compound (ES-34) must not show depreciation in tensile strength and elongation of more than 35 per cent after 96 hr. in the oxygen pressure test, while the heat-resisting compound (ES-33) must not show more than 50 per cent depreciation after 20 hr. air pressure heat test or after 168 hr. at 80° C. in oxygen pressure test.

Non-Rigid Types of Plastic

The standards committee also approved six tentative standards covering the so-called non-rigid type of plastics. These standards, developed through the intensive work of Committee D-20, cover the following: Non-Rigid Polyvinyl Chloride-Acetate Plastics (D-742-43-T), Non-Rigid Ethyl Cellulose Plastics (D-743-43-T), Non-Rigid Polyvinyl Chloride Plastics (D-744-43-T), Non-Rigid Polyvinyl Butyral Plastics (D-745-43-T), Tentative Method of Test for Stiffness in Flexure of Non-Rigid Plastics (D-747-43-T), and Tentative Method of Test for Brittleness of Non-Rigid Plastics (D-746-43-T).

The new specification for polyvinyl chloride (D-742) covers two types of transparent and opaque material which have approximately a 95 per cent vinyl chloride content. Type 1 is unfilled while type 2 contains an inert filler. There are five grades of material. Type 1 has tensile strength ranges from 1000 to 3000 psi. and the three grades in type 2 have a tensile range of 600 to 1200 psi. Various properties are specified which can be determined according to A.S.T.M. tests that are cited, including the two new tests for stiffness and brittleness.

The two types of ethyl cellulose (D-743) are divided into three grades, filled, unfilled and temperature resistant. The three types of polyvinyl plastics provided for in D-744 are for general purpose, heat and oil resistance, and cold resistance. Nine grades of material are included.

Polyvinyl Butyral Plastics

The polyvinyl butyral plastics are of thermoplastic and curing types. The materials are based on polyvinyl butyral resin, obtained by the partial acetalization with butyraldehyde of the product obtained by the complete or partial hydrolysis of polyvinyl acetate. Plasticizers, coloring agents, modifying agents, etc., can be incorporated as may be necessary to obtain the desired properties. There are seven grades of material, three thermoplastic and four of the curing type. Although the hardness serves as a general indication of grade in most cases, the hardness range of one grade suitable for a given application will overlap the hardness range of another grade. The low temperature classification as determined by the brittleness test (Thiokol Test) (D-736-43-T), also serves in classifying the various grades.

It was indicated in the new method for stiffness in flexure that the procedure is well suited for determining flexibility over a wide range. The apparatus is of the cantilever beam bending type of which the Olsen Stiffness Tester (Tour-Marshall and Olsen Design) is an example.

The test for brittleness of non-rigid plastics (D-746) establishes a temperature above which a normally non-rigid material is not brittle in its reaction to sudden deformation. The test uses an apparatus with a striking arm which moves at a designated rate. Beginning with the lowest temperature (—70° C. or at least lower than the temperature at which non-failure is thought to be), specimens are tested at 10 deg. temperature intervals until a break is not obtained. Tests are repeated until five consecutive cases of non-breaking are observed. Coolant used in the bath may be acetone, ethyl alcohol, butyl alcohol, etc. For very low temperatures liquid nitrogen is considered suitable.

Symposium on Rubber

The American Physics Society has announced that it will sponsor a Symposium on the Physics of Rubber at Northwestern University in Evanston, Illinois, on Friday and Saturday, November 12 and 13. The program is now being arranged and further details may be secured from the Society at 175 Fifth Ave., New York City.

19TH CHEMICAL EXPOSITION TO DISCLOSE NEW INDUSTRIES

A new chart of industry sustaining a world-wide war will be disclosed by the 19th Exposition of Chemical Industries, to be held in Madison Square Garden, New York City, from December 6 to 11. As usual, the exposition will be under the management of the International Exposition Co., of which Charles F. Roth is president.

Many industries, familiar in name, have been completely reorganized and are now operating along entirely new lines in producing materials, instruments, equipment and supplies that are needed in the war program, as well as arms and equipment for the fighting forces. New industries have been created by the emergency to manufacture substances unheard of before the war. These and other elements in the industrial picture combine to project the outlines of an industrial future to tax the powers of imagination.

No summary of current events in industry could be as complete and stimulating as a gathering of the industries themselves through their representatives, for purposes of information, developing perspective and planning, such as the Chemical Industries Exposition effects. Plans now being formulated by participating interests in materials, machines and production fields are already beginning to reflect some of the highlights of the new industrial relationships, though the details of exhibitors' plans are not yet ready for release.

The purpose of the Exposition is to serve the technical interests of management, chemists and chemical engineers, technologists and production executives engaged in chemical and allied industries. Admission is by invitation and registration, which excludes sensation seekers and the merely curious, and the resulting mobilization has more the effect of a laboratory or factory conference on a magnified scale than an exposition, as the word is ordinarily used.

Thermoid Completes Acquisition

Acquisition of the Jos. Stokes Rubber Co., Trenton, by the Thermoid Co., also of Trenton, the pending details of which were announced in our previous issue, has been completed. Thermoid now controls 100% stock ownership in the Stokes organization, including the Canadian subsidiary. On October 8 Thermoid filed a registration statement with the Securities and Exchange Commission covering the proposed issuance and sale of $2,500,000 principal amount of 4¼% first mortgage bonds, due October 15, 1958, and 124,250 shares of $1 par value common stock. In addition to other contemplated uses, the new financing is intended to redeem $900,000 of $1,200,000 serial notes issued on October 5 to banks to provide funds for the acquisition of 95.67% of stock of the Stokes concern.

Coming Events

Oct. 22. Boston Rubber Group, Parker House, Boston, Mass.

Nov. 2. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Nov. 12. Rubber & Plastics Section, Society of Chemical Industry, McGill University, Montreal, Can.

Nov. 12-13. Symposium on Physics of Rubber, American Physics Society, Northwestern University, Evanston, Ill.

Nov. 14-16. American Institute of Chemical Engineers, Pittsburgh, Penna.

Dec. 6-11. 19th Exposition of Chemical Industries, Madison Square Garden, New York City.

New Roll Rebuilding Service

A new service has been inaugurated by the Interstate Welding Service, Akron, Ohio, which gives definite promise of reinstating the original efficiency of much equipment now so urgently needed in the processing program for synthetic rubber. Some time ago this company announced the acquisition of an additional plant located in Barberton, Ohio. In the past few months this new plant has been equipped with many special machines and facilities for handling mill, washer and refiner rolls.

"This new service," says G. A. McLean, president of Interstate Welding Service, "has been under development for some time. The results have shown not only the practical possibilities of restoring mill, washer and refiner roll journals to proper dimensions for more efficient production, but also the vital saving provided by getting this type of equipment back on a full-scale running schedule, reducing time loss and power consumption, and making needless the investment in costly replacement rolls.

"Our new process for restoring roll journals has found a quick and widespread response. It has been of particular interest to the industry since the requirements for meeting synthetic processing quotas have been so much greater with present facilities limited both by condition of some operating equipment and war restrictions on new installations.

"The Barberton plant has been equipped now to give fast and expert service on roll journals. Our Banbury work is carried on exclusively in the Akron plant. Both plants are being operated under a central engineering and management control."

The Johnson Rubber Company, Middlefield, Ohio, started work early in October on a new steel and concrete building that will provide 21,000 feet of floor space and will be used for presses and storage. The structure is being erected near the site of the portion of the Johnson plant that was burned in a recent fire.

ODT APPROVES PLAN FOR POOLING CARBON BLACK CARS

In an effort to get more efficient utilization of the specially built freight cars and to free some of the cars for use by other industries, the Office of Defense Transportation recently approved a plan for the pooling of all privately-owned covered hopper cars used in transporting carbon black. The approval took the form of a special order—ODT R-6—which became effective September 20.

The carbon black cars are currently leased by the owners to the consumer trade. Under the ODT plan, all the cars now in use in the industry will be leased to a pool authority, which will be set up by the industry. The pool authority, in turn, will sub-lease the cars to a carbon black producer or to a bulk consumer under terms and conditions which are satisfactory to the car owners. However, the order provides that any such sub-lease must contain a provision specifying that the pool authority shall reserve the right to limit the time such cars, empty or loaded, may be detained on the producer's tracks.

The pool authority will assign each carbon black producer, as nearly as possible from the producer's own cars, the number of cars which he will require during each calendar month. Any excess cars not required by a car owner shall be subject to diversion by the pool authority to other carbon black shippers or to shippers of other commodities under terms acceptable to the car owner. It is further provided in the order that the pool authority shall not exercise control over the routing of cars engaged in the carbon black service.

Car owners must furnish the pool authority duplicate records of their car operations at such intervals as the pool authority may designate, and the pool authority will make such reports showing the use and operation of the cars in the pool as the director of ODT's Division of Railway Transport shall direct.

Introduce Thiokol ST

Thiokol Type ST, a new polymer which differs from the previous polysulfide rubbers in that it has resistance to cold flow, has been developed by the Thiokol Corporation, Trenton, N. J. In addition to retaining the excellent solvent resistant characteristics which feature the polysulfide rubbers, the new type is reported to have good low temperature flexibility without the aid of plasticizers. The resistance to cold flow which marks Thiokol Type ST is expected to open up an entirely new field of products for the polysulfide type of synthetic and the Thiokol Corporation is offering samples for evaluation purposes to the industry. Introduction of the new polysulfide rubber is said to be the culmination of ten years of laboratory effort to combine cold resistance with solvent resistance.

NEWS IN BRIEF

Hercules Powder Co., Wilmington, Delaware, has announced the establishment of a Sales Research Division to investigate new markets for the company's chemical products and to study the needs of industries served by the company. Dr. John H. Long will be in charge of the new division.

Design and adoption of an official company flag has been announced by Goodyear to provide each factory, store and district office with a means of giving public recognition to its close to 16,000 men in the armed forces. Copy on the flag includes a huge star and below it a numeral indicating the number of men in service.

The Eau Claire (Wis.) Ordnance Plant will be reconverted for the manufacture of tires shortly after January 1 and the military personnel withdrawn, according to Capt. M. M. Mason, commanding officer at the plant. Formerly the Gilette tire factory of United States Rubber Company, it was sold to the government and has been operated as a munitions plant by U. S. Rubber for about a year.

The famed "Mae West" life vest for airmen is being produced today with only half the natural rubber required when originally developed in the laboratories of Goodyear. The current type, constructed of single ply containers of rubberized fabric, is stronger and slightly lighter than its predecessor. It can be produced faster because the stitching for the fabric cover of the old type has been eliminated.

A simplified explanation of the purposes, principles, and procedures of the Controlled Materials Plan is contained in a new booklet being distributed by Manning, Maxwell & Moore, Bridgeport, Conn. The booklet is designed to help in the more effective completion of orders.

Goodrich Plastikon putty, currently employed chiefly in the sealing of metal joints in combat equipment, now is being made of synthetic rubber.

The annual convention of the Association of American Battery Manufacturers, normally held in October, was canceled due to congested conditions on trains and in hotels. The Spring meeting of the organization also was canceled for the same reason.

In order to meet mounting demands for military and essential civilian tire requirements, a $2,000,000 expansion program has been started at the Oaks, Pa., plant of Goodrich.

A bulletin on the care of sectional airbags has been issued by the Rubber Manufacturers Association, 444 Madison Ave., New York. The RMA has also issued a wall chart containing instructions for the handling of synthetic rubber capping stock. The latter is intended as an aid to retreaders.

An interesting cross-sectional report of postwar industrial research is offered in booklet form under the title "Testimony to the Future" by the National Association of Manufacturers, 14 West 49th St., New York City. It is based on a survey conducted by the Research Advisory Group of the Association, a committee of 26 scientists and leaders in industrial research.

Pliofilm "raincoats," measuring 400 square feet, are now being used to protect fighter planes, including the famous Curtiss (P-40) Warhawk, in transit to the world's battlefronts. The "raincoat" completely covers the planes from nose to rudder tab. Plane engines have long been packaged in like wise.

Production of the line of Dopp Kettles, formerly manufactured by the Sowers Manufacturing Co., is now in the hands of the Buffalo Foundry & Machine Co., Buffalo, N. Y. The engineering, manufacturing and sales personnel of Sowers has been retained by Buffalo Foundry.

Western Electric Co., which employs approximately 75,000 people in its three main manufacturing plants at Kearny, N. J., Chicago and Baltimore, has added to its facilities by establishing a new plant in Haverhill, Mass. Some 1,500 to 2,000 workers will be employed at the new factory, 60% of whom are expected to be women.

Board Chairman Paul W. Litchfield of Goodyear reports that the company, a pioneer in the development of lighter-than-air machines, is planning to resume peacetime manufacture of dirigibles and already is working on designs for airships of 10,000,000 cubic feet, larger than any previously built. The new dirigible, according to Mr. Litchfield, will play a vital role in the transportation of passengers and freight in overseas commerce.

Hycar Chemical Co., Akron, has prepared a glossary of chemical and scientific terms frequently encountered in the synthetic rubber field. Both chemical and trade names of materials are included and the most generally accepted pronunciations given, together with thumb-nail descriptions of the various items covered.

Work Joins Vulcanized Rubber

Olin C. Work, until recently associated with the L. H. Gilmer Co. of Tacony, Philadelphia, Penna., has joined the Morrisville, Penna., plant of the Vulcanized Rubber Co. as works manager, according to Stanley Renton, president of that company. Mr. Work, well-known rubber technologist, is a graduate of New Hampshire University, where he received his B.S. in 1916. He entered the rubber industry in 1919 with the Goodyear organization, after serving in World War I. In 1921 he joined Seiberling Rubber, during the formative period of that company, and was with that company for a number of years, serving in the Canadian plant during 1927-28. From 1928 to 1934 he was affiliated with the former India Tire & Rubber Co., and from 1934 to 1940 was chief chemist for the former Overman Tire Co. He joined Gilmer in 1941 as development manager, remaining with that firm until his new connection.

Leases Frazier Factory

The plant of the Frazier Rubber Products Co. at Carey, Ohio, which is reported to have ceased operations early last year, has been leased by the Seiberling Rubber Co., Akron. The leased plant will be used for the manufacture of rubber soles and heels and D. L. Frazier, who was president of the Frazier Rubber Products Co., will function as general manager.

To provide space for increased war work, North American Philips Co. will move its commercial and administrative departments this month from Dobbs Ferry, N. Y., to 100 E. 42nd St., New York City. Also to be located in the same building are the Industrial Electronics Equipment Division and the Philips Metalix Corp., now at 419 Fourth Ave., and the Philips Export Corp.

A pamphlet entitled "Treading Automobile and Truck Tires" has been issued by the U. S. Department of Commerce and covers Commercial Standard CS108-43, which was accepted by the trade as its standard for new production beginning June 10. Copies may be secured by writing the department.

U. S. Rubber observed last month 100 years of continuous experience in the production of vulcanized rubber. The Naugatuck, Conn., plant of the company was the first to start commercial production under the original vulcanization patents. The first product was an overshoe.

General Tire has expanded its machine shop facilities through the recent purchase of the Akron Machine Mold Tool & Die Co. of Cuyahoga Falls, Ohio. The plant will be operated as the metal products division of General Tire.

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REPORT 1942-43 RESULTS OF RUBBER SAFETY CONTEST

Results of the 1942-43 Safety Contest conducted by the Rubber Section of the National Safety Council, Inc., reveal that the Mishawaka, Indiana, plant of the U. S. Rubber Co. had the smallest frequency rate (.50) among the larger rubber factories, with the St. Jerome, Quebec, plant of Dominion Rubber, Canadian subsidiary of U. S. Rubber, and the Naugatuck Footwear Plant of U. S. Rubber at Naugatuck, Conn., in second and third place, respectively, in this group.

Four small plants went through the contest year without having a reportable injury, including those of Van Cleef Bros., Canadian Lastex, Ltd., Fabric Fire Hose Co., and Lobl Manufacturing Co. Outstanding facts about the contest follow:

1. Thirty-one plants competed in the 1942-1943 Rubber Section Safety Contest.
2. The average frequency rate for all contestants was 8.51.
3. Frequency rates averaged 21 per cent higher than for the 1941-1942 Contest.
4. Large plants had the lowest rates in the 1942-1943 competition. They averaged 7.89 for frequency in comparison with 18.93 for the small group.
5. Small plants had the best results in comparison with the previous Contest by reducing frequency 21 per cent. Frequency rates were higher in large plants.
6. Van Cleef Bros., Chicago, Illinois, again worked the largest number of hours without a reportable injury.

McNeil Acquires Summit Mold

According to a recent announcement, the McNeil Machine & Engineering Co., 96 East Crosier St., Akron 11, Ohio, has acquired the Summit Mold & Machine Co., 1020 So. High St., also of Akron. McNeil purchased the buildings, plant, machinery, trade-marks, patents and good-will of the Summit concern. All of the factory personnel of Summit was retained, while Walter Chalfant, formerly general manager of Summit, has been named factory manager of the new Summit Plant of McNeil Engineering. Summit manufactured a line of platen presses and individual tire and tube vulcanizers, all of which will be added to the line of devulcanizers, molds, platen presses and tire and tube vulcanizers manufactured and sold by McNeil.

Organize Caldwell Co.

Sylvester S. Caldwell and Lester W. Brock have announced their association in the Caldwell Co., 2412 First Central Tower, Akron 8, Ohio. The company is currently representing Thompson, Weinman & Co., Synthetic Products Co., and the Harmon Color Works, Inc. Mr. Brock was recently associated with the Continental Carbon Co. while Mr. Caldwell has been acting as a manufacturer's representative for the past several years.

Sylon Play Shoe Soles

The Sylon sole, a product of the A. Sandler Shoe Co., of New York City, is said to be finding favor in the play shoe field. Sylon is a specially woven fabric, coated inside with a plastic. This is wrapped around a piano-felt sole and cured, as are rubber soles, in a special mold under heat and pressure. During the process, reinforcements of scrap rubber or plastic are added to heel and toe, and finally the sole is plasticized.

Johnson Named Sales Manager

C. R. Johnson, who has been acting as a consultant for Ridbo Laboratories, Inc., of Paterson, N. J., for the past year, has been appointed sales manager of that company. Ridbo Laboratories, which is engaged in research on vegetable and animal oils, resins, and textile fibers and products, maintains a well-equipped rubber laboratory and has done considerable evaluation and experimental work with both natural and synthetic rubber. In addition to continuing to supervise the operation of the rubber laboratory, Mr. Johnson will also handle licensing arrangements in respect to the patented products and processes developed and owned by the company, as well as the sale of any products manufactured by it. Before joining Ridbo Laboratories as a consultant, Mr. Johnson was associated with the Continental Carbon Co. and Wishnick-Tumpeer, Inc., as technical director.

Introduce Rio Resin

Rio Resin, a granular resinous-like material, with a melting point of approximately 75° C., has been introduced by the R. T. Vanderbilt Co., 230 Park Ave., New York City. Loss in elongation and increase in hardness, which characterize GR-S products after aging, are considerably improved, in some types of GR-S goods, by the proper use of the new material. To obtain best properties in GR-S compounds, it is necessary to add Rio Resin after other compounding materials have been incorporated. The material has some plasticizing effects and if it is incorporated before the black is added, the dispersion of the black may be poor and consequently produce poor physical properties. When using Rio Resin, it is desirable to increase the sulfur slightly.

Additional "E" Awards

Included among companies receiving the Army-Navy "E" Award in recent weeks for production efficiency were the Beacon, N. Y., plant of the New York Rubber Corporation, and the Passaic, N. J., and Bridgeport, Conn., plants of Raybestos-Manhattan, Inc.

WARTIME POLICY ADOPTED BY UNITED RUBBER WORKERS UNION

The adoption of a specific wartime policy was the highlite of the Eighth Annual International Convention held by the United Rubber Workers of America in Toronto, Ontario, the week of September 20. Sherman H. Dalrymple was re-elected president of the union for the ninth consecutive term, while all other officers were also re-elected. For the first time in years, however, the Goodrich local has no direct representation on the union's general executive board.

The keynote of the adopted wartime policy calls for complete mobilization of all tire workers so that synthetic tire production can be expanded immediately. It urges that responsibility be placed with the local unions of the U.R.W.A. to see that tire workers now on other jobs be returned to the tire production lines as soon as possible. Other principal points of the policy include the following:

Cooperation of all local unions and managements to obtain maximum tire production from existing facilities and full capacity of available equipment.

Distribution of increased synthetic tire production on a pro rata basis among all tire and tube plants in the country, based on their pre-war capacity.

Strong opposition by the union to any type of job drafting.

Current Uses of Koroseal

More than 90% of the entire production of Koroseal has been allocated to direct military uses, according to a talk made by L. H. Chenoweth, of the B. F. Goodrich Co., before a group of department store executives in New York on September 15. About 60% of all production, he said, has gone into sheathing for wire and cable insulations, largely on shipboard, while another 25% has gone into waterproof clothing for the Army and Navy. Other uses mentioned by Mr. Chenoweth included its application in the form of sponge for cushioning tank interiors, as a coating on alpaca-lined coats, face masks for Arctic service, covers for bombsights and other delicate instruments, ski-tent fabrics, and mustard gas-proof trench door covers. It is also being used in the form of hose for gas decontamination units.

Form Thread Advisory Group

The War Production Board recently organized an industry advisory committee of rubber thread manufacturers, composed of the following members: J. E. Brogdon (Carr Mfg.), E. A. Galleher (Latex Processing), E. W. Howard (Firestone Rubber & Latex), George Keltie (American Wringer), A. B. Lloyd (Lloyd Mfg.), William Pitcher (Easthampton Rubber Thread), G. K. Ryan (Goodrich), and Harlowe Waite (U. S. Rubber). Adam Clement, of WPB, is government presiding officer of the committee.

NAMES IN THE NEWS

CLYDE O. DELONG, manager of operations, industrial products sales division of the B. F. Goodrich Co. at Akron since 1941, has been named manager of Goodrich and Miller drug sundries sales. GEORGE J. FISHER, formerly assistant operating manager, has been appointed acting operating manager of the division.

CHARLES W. CARVIN, vice-president in charge of the Yarn Division of the Industrial Rayon Corp. since 1941, has been appointed vice-president in charge of sales of that company, succeeding GEORGE F. BROOKS, resigned. GEORGE I. ROUNDS, with the company for 20 years, has been named assistant sales manager in charge of tire and weaving yarns.

E. R. WAITE, formerly manager of the mechanical goods division of the Master Tire & Rubber Corp., has joined the Wabash, Indiana, plant of the General Tire & Rubber Co., in an executive position.

EDWARD H. CLOHESSY, formerly associated with the H. O. Canfield Co., and prior to that with the U. S. Rubber Co. at Naugatuck, Conn., has joined the Connecticut Hard Rubber Co., New Haven, Conn., as production manager.

THOMAS J. WOOD, who joined the Procter & Gamble Co., Cincinnati, as a salesman in 1919, has been elected vice-president in charge of sales and a director of the company. He succeeds the late CLARENCE J. HUFF.

CARLETON SMITH, until recently serving as financial research advisor to the Rubber Development Corp., has joined the Celotex Corporation as assistant to the president. He will make his headquarters in New York.

C. A. DWYER, associated with the Office of the Rubber Director at Washington, D. C., for the past six months, has been appointed a member of the merchandising department of the B. F. Goodrich Co. at Akron. He has been associated with the rubber industry since 1919.

A. L. GOSSMAN, affiliated with the diatomaceous earth industry since 1915, has been elected president of the Dicalite Co., succeeding C. A. FRANKENHOFF, who is now chairman of the board of the company.

LOUIS L. SHAPIRO, who has been associated with the Wilson-Martin Division of Wilson & Co., Inc., for the past fourteen years, has been appointed plant manager of the Glyco Products Co., Inc., Brooklyn, N. Y. He matriculated at Franklin & Marshall College and the Drexel Polytechnic Institute.

ROBERT W. PEASE, formerly with the Calco Chemical Co., has joined the rubber and plastic research division of Foster D. Snell, Inc., at Brooklyn, N. Y. THEODORE "TED" SULLIVAN heads this department.

G. FRED HOGG, who has been serving as technical assistant superintendent of the industrial explosives plant maintained by the Hercules Powder Co. at Hercules, Calif., was recently appointed sales director of the company's naval stores department. He will maintain headquarters at the main offices in Wilmington, Delaware.

GEORGE D. KRATZ, well-known rubber chemist, who has been serving with the regional laboratory of the Department of Agriculture in Philadelphia, has joined the Rubber Reserve Co. at Washington, D. C.

R. D. WOOLERY, general manager of the Polson Rubber Co., Garretsville, Ohio, addressed the Kiwanian Club at Kent, Ohio, on September 23. He discussed the current synthetic rubber situation.

THOMAS C. EDWARDS, formerly associated with the B. F. Goodrich Co. at Akron, has joined the Davidson Rubber Co., Charlestown District, Boston, as chief chemist and factory superintendent.

K. D. SMITH, associated with the B. F. Goodrich Co. in various executive capacities for many years, and who has been associated with the Detroit division for the past year, has been transferred to the company's office in Washington, D. C., as manager of government sales and service.

W. A. EGAN, JR., who has been acting as manager of scrap control at the Fisk plant of the U. S. Rubber Co. at Chicopee Falls, Mass., has been named chief chemist at that plant. W. GLEED "BILL" COE, formerly associated with RUBBER AGE, who has been at the Fisk plant for the past few years, has been named manager of scrap control.

J. W. VAN RIPER, who has been associated with the industrial refrigerator and controlled heat field for the past fourteen years, has joined John Royle & Sons, Paterson, N. J., as sales representative for the southeastern territory.

WILLIAM S. RICHARDSON, manager of the industrial products sales division of the B. F. Goodrich Co., has been named head of the newly-created chemicals division. E. F. TOMLINSON succeeds him in his former post.

Ingmanson with Whitney Blake

John H. Ingmanson, associated with the Bell Telephone Laboratories as a research chemist since 1928, has joined the Whitney Blake Co., Hamden, Conn., as vice-president in charge of production. Whitney Blake manufactures insulated wire and cable. Born in Sycamore, Ill. on April 9, 1898, Mr. Ingmanson attended the Universities of Chicago and Illinois. Before joining the Bell Laboratories he was affiliated with the beet sugar, dyestuffs and tin foil industries, and at one time was works manager of the Crown Chemical Corp., manufacturers of intermediates for dyestuffs. Mr. Ingmanson is married, has two sons, and is active in both the A.C.S. and A.S.T.M. He is currently chairman of the New York Rubber Group.

Wolf Joins Polson Rubber

Ralph Wolf, who was associated with the Rubber Branch of the Office of Production Management, and its successor organization, the Office of the Rubber Director, since August, 1941, in the capacity of a synthetic rubber expert, has resigned from government service and has joined the Polson Rubber Co., Garrettsville, Ohio, as chief chemist. A graduate of the Catholic University of America, Mr. Wolf was associated with Goodrich from 1932 to 1940, spending some time at the Kitchener, Ontario, plant. He joined the Standard Oil Development Co. late in 1940 and remained with that organization until he went to Washington in 1941. Mr. Wolf is co-author of the popular book, "Rubber—A Story of Glory and Greed."

G. V. KULLGREN, formerly associated with the Industrial Engineering Division of General Electric Co. at Schenectady, N. Y., where he specialized on the application of electrical equipment in the rubber industry, has joined the Akron, Ohio, staff of the Farrel-Birmingham Co., Inc. He recently has served with the Office of the Rubber Director at Washington, D. C.

GILES E. HOPKINS, one of the most widely-known research executives in the textile industry, has been appointed research manager of the Textile Research Institute, Inc. He is a graduate of M. I. T. and for many years was technical director of the Bigelow-Sanford Carpet Co.

C. J. BACKSTRAND, associated with the Armstrong Cork Co. for many years, has been named vice-president in charge of manufacturing of that company, succeeding H. P. SMITH, JR., who has been granted an indefinite leave of absence.

JEAN R. NESBIT, sales representative of the Continental Carbon Co., and son of J. H. NESBIT, president of the U. S. Rubber Reclaiming Co., is slated to enter the Army on October 21.

RUBBER SYMPOSIUM FEATURES PHYSICAL SOCIETY'S MEETING

The 1943 Autumn Meeting of the American Physical Society, to be held at Northwestern University, in Evanston, Ill., on Friday and Saturday, November 12 and 13, will feature a Symposium on the Physics of Rubber and Other High Polymers. Fifteen 30-minute papers will be presented at three separate sessions, to be held on Friday morning and afternoon and Saturday morning.

All sessions will be held in the Technological Institute of the University, which may be reached from Chicago by elevated trains. A dinner will be held on November 12 in the Georgian Hotel in Evanston. Reservations should be made in advance by letter to Professor B. J. Spence at Northwestern University. The program follows:

Friday Morning, Nov. 12

(1) Present Status of Theory of Elasticity of Rubber, by H. M. James, Purdue University.

(2) Stress-Temperature Relations in Synthetic and Natural Rubbers, by L. A. Wood and F. L. Roth, National Bureau of Standards.

(3) Some Physical Properties of Natural and Synthetic Rubber, by W. B. Wiegand, Columbian Carbon Co.

(4) Hysteretic and Elastic Properties of Rubber-Like Materials under Dynamic Shear Stress, by J. H. Dillon, I. B. Prettyman, and G. L. Hall, Firestone Tire & Rubber Co.

(5) Drift and Relaxation of Rubber, by M. Mooney, U. S. Rubber Co.

Friday Afternoon, Nov. 12

(6) Light Scattering in Solutions, by P. Debye, Cornell University.

(7) Physical Methods of Analysis of Synthetic and Natural Rubber, by R. B. Barnes, American Cyanamid Co.

(8) Some Physical Properties of Commercial Polymerized Methyl Methacrylate, by H. A. Robinson, Armstrong Cork Co.

(9) Rheological Properties of Natural and Synthetic Rubber, by R. H. Kelsey and J. H. Dillon, Firestone Tire & Rubber Co.

(10) A New Extrusion Plastometer, by J. M. Davies, B. F. Goodrich Co.

Saturday Morning, Nov. 13

(11) Crystallization of Long-Chain Compounds, by I. Fankuchen and H. Mark, Brooklyn Polytechnic Institute.

(12) X-Ray Observations on the Structure of Rubber and the Size and Shape of Rubber Crystallites, by S. D. Gehman and J. E. Field, Goodyear Tire & Rubber Co.

(13) Stress Relaxation of Natural and Synthetic Rubber Stocks, by A. V. Tobolsky, I. B. Prettyman and J. H. Dillon, Firestone Tire & Rubber Co.

(14) Hysteresis Losses in High Polymers, by H. S. Sack, Cornell University.

(15) Measurement of the Surface Area of Carbon Black by Low-Temperature Absorption, by P. H. Emmett, Johns Hopkins University.

Assistant Works Manager

Arthur Kelly

Arthur Kelly, associated with the B. F. Goodrich Co. in diversified activities since 1925, has been appointed assistant works manager of that company. First in the company's chemical laboratories, he later served in the compounding, tire construction and processing divisions. After spending several years in the Los Angeles factory, Mr. Kelly represented the company's interests abroad, returning to the United States to build and operate the plant at Oaks, Penna. When the Clarksville, Tenn., plant was constructed, he became its first manager. Since the war began, Mr. Kelly has superintended the construction and early operations of the Lone Star Ordnance plant operated by Goodrich in Texas and four synthetic rubber plants.

Buffalo Hears Plastics Talk

A talk on "Plastics in Aircraft Applications," presented by Dr. J. T. Grey of the Research Laboratory, Airplane Division, Curtiss-Wright Corp., was the feature of the meeting held by the Buffalo Group, Rubber Division, A.C.S., at the Hotel Westbrook in Buffalo on September 23. Approximately 80 members and guests were in attendance. Dr. Grey, formerly associated with the Durez Plastics & Chemicals Co., traced the early development of plastics for the airplane industry, and continued on up to present researches. He broke down the uses of plastics in airplanes into three groups: (1) Those which involve structures; (2) Semi-structures; and (3) Non-structural applications. A large and interesting display of plastic parts for airplane application was exhibited by the speaker.

An Index to Vol. 53 of Rubber Age will be found on Pages 91 to 94 of this issue.

LOS ANGELES RUBBER GROUP RESUMES REGULAR MEETINGS

After a summer's recess, broken only by the annual two-day outing at the Uplifters' Club, the Los Angeles Group, Rubber Division, A.C.S., resumed its regular monthly supper meetings in the Rainbow Room of the Mayfair Hotel in Los Angeles on October 5. The meeting attracted a record attendance.

The program had a definite synthetic rubber flavor. Hector A. Haight, Los Angeles manager of the Reconstruction Finance Corporation, spoke on that organization's work in financing the war effort, with special reference to its work in connection with the tremendous synthetic rubber program. Jack Lockridge, technical superintendent of the copolymer unit operated by Goodyear in Los Angeles, then discussed the manufacture of GR-S. An interesting film, "Life and Death on the U.S.S. Hornet," was shown through the courtesy of O. A. Coons, head of the Hollywood Film Exhibitors.

Several changes in the group's constitution were proposed during the business session. These included an increase in the annual dues, the employment of a paid secretary, and the establishment of an information bureau. The 1944 Year Book came up for discussion and it was generally agreed that the new edition will be one of the outstanding books of its kind to be published. A nominating committee to present a slate for next year's officers was named. Committee reports indicated that the membership was at an all time high and that the treasury was in excellent condition.

Another feature of the meeting was the solicitation of blood donors. It was announced that October 19 would be "Donor's Night" at the American Red Cross headquarters. In winding up the meeting, the usual number of door prizes were distributed.

Fire Guts Eagle Rubber Plant

The four-story plant of the Eagle Rubber Company at Ashland, Ohio, was almost completely gutted by fire on September 25. The fire, the worst witnessed in Ashland for almost 60 years, followed an explosion of several gasoline and oil tank cars after 23 cars in a freight train were derailed at a main highway crossing. According to Richard E. Long, president and general manager of Eagle Rubber, who estimated the damage to the plant at approximately $300,000, both the roof and upper floor of the plant were destroyed while the lower floors suffered considerable water damage. The plant, which was engaged in the production of life belts and rubber rafts, among other military products, will be out of operation for some time to come. The company, however, is currently scouring available space in Ashland so that it may resume operations as quickly as possible. The fire also destroyed several other factories adjacent to the Eagle Rubber plant, total damage being estimated at almost $1,000,000.

Who's Who in Washington—and Where

(As of October 11, 1943—Compiled by the Staff of RUBBER AGE)

OFFICE OF THE RUBBER DIRECTOR

New Municipal Building, 4th and D Sts., N.W., Washington, D. C.

Rubber Director—Bradley Dewey.
Assistants to Director—Morehead Patterson & Stanley Osborne.
Administrative Officer—Frank P. Downey, Jr.
Deputy Director—L. D. Tompkins.
Chief, Priorities & Mat. Control Sect.—L. P. Best.
Chief, Allocations & Statistics Br.—G. B. Kayser.
Chief, Statistics Sect.—H. M. James.
Chief, Production Br.—J. H. Higgins.
Chief, Tires & Tubes Sect.—Geo. Beardshaw.
Chief, Recapping & Retreading Sect.—V. P. Gopcevic.
Chief, Drug Sundries—E. J. Casey.
Chief, Coating, Proofing & Spreading—G. R. Toney.
Chief, Footwear—F. R. Olson.
Chief, Mechanical Goods—J. E. Skane.
Chief, Soles & Heels—W. P. Harty.
Chief, Scrap & Reclaim—C. F. Smith, Jr.
Ass't Director (Prod. Development & Conversion)—E. B. Babcock.
Head, Product Specifications—G. L. Allison.
Ass't Director (Plant Construction)—Frank R. Creedon.
Assistant—W. E. O'Brien.
Ass't Director (Research & Development)—E. R. Gilliland.
Head, Education Program—Dr. H. E. Simmons, assisted by John M. Ball.

RUBBER DEVELOPMENT CORPORATION

1626 K St., N.W., Washington, D. C.

Chairman of the Board—Leo T. Crowley.
President—Douglas H. Allen.
Vice-Presidents—John W. Bicknell (Executive) and S. M. McAshan, Jr. (Operations in Brazil).
Assistant Vice-Presidents—Ford Studebaker and F. W. Utz.
Secretary—George H. Hubert.
Treasurer—W. C. Beck, Jr., and Frank Farrington.
Budget Office—Don C. Carnes and Wm. J. McNamee.
Head Field Technician—C. B. Manifold.
Regional Administration—
Brazil—R. B. Bogardus.
Bolivia, Peru—James C. Roberts and Walter A. Graham.
Other South America—Bernard B. Carlin and E. W. Mills.
Central America and Mexico—Harland J. Corson and Robert M. Hutchins.
Plantations—M. D. Knapp and Valentine O. Goodell.
Supplies Procurement—Norman D. McDonald.
Rubber Purchasing—L. B. Proctor and George Pell.
Rubber Products Distribution—Richard Cooke and Harry A. Carragher.
Commercial Research—Everett G. Holt and Joshua F. Dunbar.
Aviation Division—Ford Studebaker.
Personnel—Charles B. Rollins and John C. Lang.

Note: Supplies Procurement Office in H.O.L.C. Building, 1st and Indiana Ave., N.W., Washington, D. C.

RUBBER RESERVE COMPANY

811 Vermont Ave., N.W., Washington, D. C.

Chairman of the Board—Jesse H. Jones.
President—Howard J. Klossner.
Special Assistant—China R. Clarke.
Vice-Presidents—R. D. Young, Henry A. Mulligan, Stanley T. Crossland and John W. Livingston.
Secretary—George H. Hubert.
Treasurer—W. C. Beck, Jr.
General Counsel—H. Clay Johnson.
Chief, Synthetic Rubber Production—H. F. Palmer.
Assistants—W. R. Hucks and George L. Roberts.
Chief, Administration Division—W. Arthur Murphy.
Consultant—A. L. Viles.
Scrap Rubber—W. J. McCauley.
Sales—H. C. Bugbee.
Latex Sales—Richard Baybutt.

OFFICE OF PRICE ADMINISTRATION

Third and Independence Ave., N.W., Washington, D. C.

Rubber Price Branch

Price Executive—Lester V. Chandler.
Chief Counsel—John N. Cole.
Head, Raw Materials and Financial Section—George W. Bolton.
Head, Tire Price Section—Robert V. Mitchell.
Head, Other Rubber Products Section—Everett D. Hawkins.
Head, Rubber Section, Accounting Division—John S. Bartlett.
Head, Rubber Section, Standards Division—T. M. Miller.
Head, Special Projects Section—Kenneth E. Lawton.
Administrative Officer—Arthur F. Schalk, Jr.

Automotive Supply Rationing Division

Director—Charles F. Phillips.
Legal Counsel—David L. Lloyd.
Head, Field Section—H. C. Butkiewicz.
Assistants—J. W. Bonbrest (Tires) and H. F. McGrath (gasoline).
Administrative Officer—John B. Annett.
Chief, Tire Rationing Branch—S. E. Bonnett.
Assistant—James Leavey.
Heads, Tire Rationing Branch—R. G. Leeth (Eligibility Section), A. Koehler (Tire Industry Section), A. G. Richtmyer (Research Section), L. A. Brown (Tire Inspection Section), and Frank Dougall (Quota Section).

GUAYULE EMERGENCY RUBBER PROJECT

315 West 9th Street, Los Angeles, California

Assistant Chief, Forest Service—C. M. Granger.*
Executive Officer—G. R. Salmond.*
Acting Director—Paul H. Roberts.
Assistant Director—E. L. Perry.
Chiefs—L. C. Stockdale (Business Management), J. R. Nelson (Personnel and Labor), John L. Emerson (Nursery Management), Henry L. Lobenstein (Plantation Management), Dr. W. G. McGinnies (Surveys and Investigations), James J. Byrne (Engineering and Mill Operation).
Director of Research—Dr. A. C. Hildreth.
Assistants—Dr. LeRoy Powers (Plant Breeding), Dr. Hamilton P. Traub (Plant Physiology), Dr. William A. Campbell (Pathology), Delmar C. Tingey (Agronomy), Dr. Omar J. Kelley (Soils), Raiford L. Holmes (Rubber Analyses), Harold W. Reynolds (Indicator Plots), S. W. McBirney (Agricultural Machinery).
Entomology—T. P. Cassidy.
Chemical Engineer—George W. Miller.

Note: Most of the personnel listed above are members of the Forest Service, while others are officially members of the Bureau of Plant Industry. They are all located at the Los Angeles address, except those indicated by an asterisk, the latter being located at the Department of Agriculture in Washington, D. C.

CANADIAN NEWS

Production of synthetic rubber tires for civilian use is not likely to increase beyond the present volume, H. W. Gregory, vice-president of the Seiberling Rubber Co. of Canada, told the Oshawa (Ont.) Rotary Club on September 30. The production schedules of all tire manufacturers are restricted by manpower shortages, Mr. Gregory explained.

"Even if we had plenty of rubber, either synthetic or natural, we would not be able to produce any more tires than we are now doing," said Mr. Gregory, "because of the shortage of labor in our factories." For the same reason, the speaker predicted that motorists will experience difficulty in securing retreaded tires although ample supplies of camelback or reclaimed rubber are available to retread civilian tires.

The manufacture of synthetic tires is still in the experimental stage insofar as producing tires of comparable efficiency with pre-war tires is concerned, Mr. Gregory stated. Problems are being solved and synthetic rubber has some characteristics better than natural rubber, he continued, but the "ersatz" material is deficient in other qualities. These deficiencies are particularly encountered in producing a high quality automobile tire and limited speeds are advised for synthetic rubber tires now being produced.

Manufacture of synthetic inner tubes will be started next month, according to Mr. Gregory. Increased size varieties are necessitated, he informed, as the synthetic tubes will not have the same elasticity as natural rubber tubes and therefore they will have to be made to fit tire interiors exactly.

Alarm at the number of rubber workers in Kitchener and Waterloo, Ont., who have contracted a type of inflammation of the skin was expressed at Montreal on September 29 by Alderman Claren Seibert, chairman of the Kitchener City Council Workmen's Grievance Committee, and Alderman Alfred Mustin, a member of the committee. According to the aldermen, the committee is arranging a meeting with the Workmen's Compensation Board at which this will be one of the subjects for discussion. It is stated that the type of infection is not new in the rubber industry, although there have been few cases reported by that industry in recent years. The aldermen explained that there had been quite a number of cases, some of which had been diagnosed as occupational dermatitis, the majority, however, being of a minor nature. It is the desire of the committee, it was pointed out, not simply to arrange compensation but to get at the root of the trouble.

The first Canadian commercial running of butyl-coated fabric has been produced at the Barringham Rubber Company's plant at Oakville, Ont. The first order of the Barringham company is for use of men in the Canadian Navy, Edward Barringham, president of the firm, announced recently, adding that the new protective garments are to be provided for all the armed forces. "Our first supply of crude butyl has come from the United States," Mr. Barringham said, "but soon Canada will be producing its own butyl at our new plant at Sarnia, Ont."

United Rubber Workers of America (C.I.O.), in convention at Toronto on September 23, adopted a resolution favoring an intensive organization campaign among rubber workers in Canada. Of 315 union members attending the conference only 17 were Canadian. These came from Kitchener, Hamilton, Toronto, Bowmanville, and New Toronto. The resolution read: "We have only yet reached the fringe of our jurisdiction. Such areas as Quebec and the synthetic plant in Sarnia, Ont., have not yet been organized, although our jurisdiction covers approximately 25,000 people in two concentrated sections—Ontario Central and around Montreal."

Plans for the erection at Kitchener, Ont., of an addition to the plant of the B. F. Goodrich Co. of Canada to house a cafeteria for the company's workers have been announced. It is estimated that the project will cost approximately $20,000.

Gutta Percha & Rubber, Ltd., honored Montreal, Ottawa, and Quebec members of the newly-formed Twenty-Five Year Club at a dinner on October 8 in the Mount Royal Hotel, Montreal. Similar dinners were held from coast to coast and a transcribed message of greeting from F. A. Warren, president of the company, was presented at each. All members were presented gold watches, appropriately inscribed.

President Elie Lescot of Haiti said while in Canada early this month that next March or April his country will go into the production of rubber, and he distributed samples of the Haitian product to prove its quality. Every resource of Haiti is being devoted to helping the United Nations, he said, with food, rubber, and sisal for ropemaking. President Lescot told of the development of the cryptostegia plant from which his country hopes to produce rubber next spring. Some 150,000 Haitians are engaged in direct war work in the production of rubber and sisal, it was stated.

Some Foreign Developments

A few developments in the rubber industry abroad, as recorded by the Bureau of Foreign & Domestic Commerce, follow:

Sweden: Efforts to develop satisfactory rubber substitutes for soles and heels are reported to have met with considerable success. One product, a synthetic material called "Modotiol" has been developed by the Nordiska Gummi Fabriks, A.B., in Sundyberg. An annual capacity for manufacturing 1,100,000 pairs of half soles of this material is expected to be reached this year.

Finland: With the exception of private stocks not in excess of 5 kilograms, and military stocks, all supplies of rubber in Finland were confiscated in March of this year. Strict control is now exercised over the entire trade, and dealers regularly must furnish current accounts of their holdings, imports, production and sales. The Finnish Rubber Factory acts as the central rubber-sales organization.

Rumania: A new company, with a capital of 5,000,000 lei, has been formed for the production of synthetic rubber. A process recently developed at the refinery of Petrolina will be used, with the government receiving 10% of the net profit.

FINANCIAL NEWS

Faultless Rubber Co.

Year Ended June 30: Net profit of $119,001 before renegotiation of war contracts and after provisions of $458,700 for Federal income taxes and $50,000 for post-war and other contingencies, equal to $1.82 a common share, which compares with $130,367, or $1.99 a share, reported for the previous fiscal year. Gross profit for the 1943 fiscal year amounted to $811,098 before deductions. The balance sheet as of June 30, 1943, shows current assets of $1,381,665, including $518,663 in cash and $273,791 in accounts receivable, against current liabilities of $582,689, including $501,539 for taxes and $26,552 in accounts payable. Net current assets showed an increase of $59,495 over the previous year and a total amount of $798,976, the equivalent of $12.21 per share of stock. Despite current restrictions of rubber consumption, the report states that the company produced and shipped a volume slightly in excess of 50% over the preceding fiscal year.

O'Sullivan Rubber Co.

Eight Months Ended Aug. 31: Net income of $119,118, which compares with $282,003, before income taxes, in the corresponding period of 1942. Net income for the month of August amounted to $5,807, compared with $46,662, before income taxes, in the corresponding month of the previous year.

LOS ANGELES NEWS

Bert E. Biheller, branch manager for H. Muehlstein and Co., Inc., was married on Sunday, October 10, to Miss Vera Gardner of Los Angeles. The couple was scheduled to spend two weeks on a honeymoon but geographical locations were withheld even from friends. Mr. Biheller has been in Los Angeles about two years.

Karl Faulhaber, of the Faulhaber Rubber Company, has been nursing a badly injured arm for some weeks. The arm was caught in a machine in the plant. Mr. Faulhaber has suffered quite intensely but hopes for full recovery.

Bill Wolfe, factory manager of all Goodyear Domestic plants, Akron, spent the early part of October in Los Angeles.

Monty Montgomery, local manager for Martin, Hoyt and Milne, Inc., has earned a medal although he has not developed a hero complex. He is the first member of the Los Angeles Rubber Group to kill a rattlesnake in his own yard. Monty lives in a canyon back of Pasadena and was surprised to encounter the big venomous fellow at his back door one bright sunshiny morning.

Ed Royal is back on the job at the offices of H. M. Royal, Inc., after spending a week's vacation with his family at Laguna Beach.

E. D. Caram, proprietor of the Caram Manufacturing Company, is scheduled for a trip to Canada as soon as the requisite papers are available. Points to be visited are to include Montreal and Quebec. Mr. Caram quite recently returned from a vacation jaunt with his family to San Francisco and other points north. During these recent months Mr. Caram has somewhat retired from his rubber and cement factory work and is spending a great deal of his time handling real estate.

Lombard Smith, of the Lombard Smith Company, accompanied by his wife, left for the East October 15 with the intention of returning to Los Angeles about November 10. Points to be visited include New York, Washington, Cleveland, Akron, and Chicago.

Vic Vodra, local manager for the R. T. Vanderbilt Co., Inc., is the father of a son born during the last month.

A course in rubber technology is in progress again this fall at the University of Southern California. The instructors are Ray B. Stringfield of Vultee Aircraft, Inc., first president of the Los Angeles Rubber Group, and Fred Woerner of Standard Rubber, Inc. This course is held each year and draws a good attendance.

Bill Haney, plant superintendent for the Kirkhill Rubber Company, is the father of a daughter born during the past month.

More prairie chicken is the story of Kirk Hill, president of the Kirkhill Rubber Company, who has during the past month spent two weeks hunting in North Dakota and Saskatchewan. Kirk makes this trip every year and always comes back with a wagonload of birds to which he treats all of his friends.

Stokes Royal, son of Ed Royal of H. M. Royal, Inc., who is connected with the U. S. air field service as an ambulance driver, and who spent a few days at home recently on a furlough, has now arrived in India, according to a cablegram recently received by his father. The young man has seen service in various parts of the Orient and in North Africa in the last eighteen months. A second son, Lewis Royal, is serving with the U. S. Army in Hawaii, and has not been home for nearly two years.

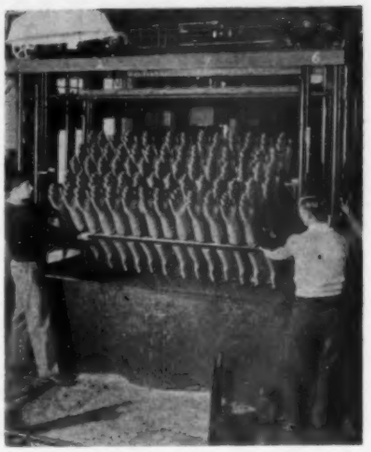
Charles Lamb, Jr., is the president of a new rubber manufacturing company known as the Lamb Rubber Corporation and located at 801 Milford Street, Glendale. The building is fireproof, 75 by 150 feet in dimensions, with a second story over a portion of it. A general line of mechanical rubber goods, both natural and synthetic, is being turned out, while some experimenting is being done in plastics. Milford Kane, a new man in Los Angeles, is vice-president of the corporation; Clarence Eubanks is secretary-treasurer; and Ed Westberg is a director.

The corporation owns a building site in Alhambra where the intention originally was to erect a plant but for the duration the corporation will now occupy the location in Glendale. Operations started with about fifteen employees.

Recent visitors at the Goodyear plant were Dr. R. P. Dinsmore, vice-president in charge of research and development, and John B. Ingle, assistant manager of the crude rubber division.

The Los Angeles Rubber Group has established an office in the Mayfair Hotel and all details in connection with the affairs of the group in the future will be conducted from there. The intention at the present writing is to employ a full time or a half time secretary. The work had become pretty heavy for individuals who have volunteered their services and for the regular officers of the group.

Anti-Vesicant Gloves



A new application of synthetic rubber is in the manufacture of anti-vesicant gloves for use by decontamination squads in chemical warfare. These gloves are impervious to deadly mustard gas and are now being made in quantity for the Quartermaster Corps by the U. S. Rubber Co. In the accompanying photograph, the dipping unit is applying an even coating of neoprene latex to the form.

New Type "Water Wings"

The Army's jungle troops now go into action over swampy terrain equipped with "water wings" made from cotton and Saflex, the rubber-like plastic developed by the Monsanto Chemical Co. Actually, the "water wings" are two separate envelopes about the size of a squared football bladder which the soldier carries folded in his pack. When necessary, he inflates the envelopes and tucks them under his armpits, holding them in place by buttoning his blouse. Officially termed flotation bladders, the "water wings" may also be used to carry extra water or may be inflated to serve as a pillow. The envelopes are made by combining squares of cotton fabric with Saflex, then heat-sealing two of the squares with the fabric side out. A short piece of rubber tubing serves as the inflation valve.

Montreal Meets November 12

The next meeting of the Rubber and Plastics Division, Montreal Section, Society of Chemical Industry, is scheduled for Friday, November 12, at McGill University, Montreal, Canada. The speaker will be W. B. Wiegand, director of research of the Columbian Carbon Co., New York, who will discuss "New Developments in Colloidal Carbons." The group held a meeting on October 1 at which "The Manufacture of Plastic Materials" was discussed by Dr. I. R. McHaffie, manager of research and development of Canadian Industries, Ltd. A motion picture on plastics was also shown.

Mister—you're getting paid in DYNAMITE!

LET'S NOT KID OURSELVES about this. Our pay envelope today *is* dynamite.

If we handle it *wrong*, it can blow up in our face . . . lengthen the war . . . and maybe wreck *our* chances of having happiness and security *after* the war.

The wrong way to handle it...and why

The wrong way is for us to be good-time Charlies. To wink at prices that look too steep . . . telling ourselves we can afford to splurge.

We *can't* afford to—whether we're business men, farmers, or workers. And here's why:

Splurging will boost prices. First on one thing, then all along the line.

Then, wages will have to go up to meet higher prices. And higher wages will push prices up some more . . . faster and faster, like a runaway snowball.

The reason this can happen is that there is more money in pay envelopes today than there are things to buy with it. This year, we Americans will have *45 billion* dollars more income than there are goods and services to buy at present prices. *45 billion dollars extra money!*

That's the dynamite!

The right way to handle it...and why

Our Government is doing a lot of things to keep the cost of living from snow-balling.

Rationing helps. Price ceilings help. Wage-and-rent stabilization helps. Higher taxes help. They're *controls* on those dangerous excess dollars.

But the real control is in our hands. Yours. Mine.

It won't be fun. It will mean sacrifice and penny-pinching. But it's the only way we can win this war . . . pay for it . . . and keep America a going nation afterwards.

And, after all, the sacrifice of tightening our belts and doing without is a small sacrifice compared with giving your life or your blood in battle!

Here's what You must do

Buy only what you absolutely need. And this means absolutely. If you're tempted, think what a front-line soldier finds he can get along without.

Don't ask higher prices—for your own labor, your own services, or goods you sell. Resist pressure to force YOUR prices up.

Buy rationed goods only by exchanging stamps. Shun the Black Market as you would the plague.

Don't pay a cent above ceiling prices.

Take a grin-and-bear-it attitude on taxes. They must get heavier. But remember, these taxes help pay for Victory.

Pay off your debts. Don't make new ones. Getting yourself in the clear helps keep your Country in the clear.

Start a savings account. Buy and keep up adequate life insurance. This puts your dollars where they'll do you *good*.

Buy more War Bonds. Not just a "percent" that lets you feel patriotic, but enough so it *really* pinches your pocketbook.

If we do these things, we and our Government won't have to fight a post-war battle against collapsing prices and paralyzed business. It's *our* pay envelope. It's up to *us*.

KEEP PRICES DOWN!

Use it up • Wear it out
Make it do • Or do without

This advertisement, prepared by the War Advertising Council, is contributed by this Magazine in co-operation with the Magazine Publishers of America.

OBITUARIES

J. Frank Cooper

J. Frank Cooper, nationally known balloon maker and designer of the first rubber life raft, died at City Hospital, Akron, on October 3, after more than thirty-two years with the Goodyear Tire & Rubber Co. He was 58 years old.

During World War I, Mr. Cooper designed and supervised the building of hundreds of training and observation balloons. He was an official on construction of the dirigibles Macon, Akron, Shenandoah, and Los Angeles, and constructed the figures for the Macy Thanksgiving Day parades in New York City.

In addition to his renown as a balloon maker, Mr. Cooper was one of the world's outstanding balloon pilots and got the idea for his life raft after the noted international balloonist, Ward T. Van Orman, had suggested pontoons for the baskets of balloons to prevent riders from getting a "ducking" if they landed in water. The inflatable raft was the next step.

Born in West Virginia, Mr. Cooper located in Akron as a young man. He is survived by his widow, a son, and a daughter.

Fred Colley

Fred Colley, an employee of the Goodyear Tire & Rubber Co. for 45 years and, since 1928, director of employees' activities, died in his office on September 9 of a heart attack. He was 64 years of age.

A member of the Old Guard, comprised of men and women who were with Goodyear when the company was organized, Mr. Colley started to work in the press room on December 23, 1898, on his 20th birthday, advanced rapidly to the position of foreman for crude rubber, and later became foreman of the compounding room and general foreman of crude rubber.

A native of Akron, he previously had been employed by the India Rubber Co. of that city and also by the old Aetna Rolling Mill, Cleveland. Mr. Colley was a member of Joppa Lodge. He is survived by a daughter-in-law and three grandchildren.

Willard H. Tiffany

Willard H. Tiffany, 48, chief chemist of the United States Testing Company, Hoboken, N. J., died of a heart attack on the golf course at Kissena Park, Flushing, L. I., on October 10. A resident of Hollis, Queens, Mr. Tiffany was born in Oswego, N. Y., and in the first World War served in the Syracuse University Ambulance Corps in Europe. Following the war, he received his degree in chemistry from Syracuse. He is survived by his widow and a daughter.

Dr. H. Otto von Wedel

Dr. Hassow Otto von Wedel, well-known pathologist, and co-author of the article on "Observations on the Toxic Effects Resulting from Exposure to Chlorinated Naphthalene and Chlorinated Phenyls," which appeared in the August, 1943, issue of RUBBER AGE, killed himself on October 10 by firing a shotgun blast into his head in the library of his home in Ardsley Park, N. Y. His death was listed as "a suicide while mentally disturbed." Dr. von Wedel, who was 56 years of age, was a graduate of Columbia University and New York University. He had a large practice and maintained five separate laboratories. His widow and daughter survive, as well as two sons from a previous marriage.

Louis E. Lannan

Louis E. Lannan, vice-president of the Pennsylvania Industrial Chemical Corp., died in his home in McKeesport, Pa., on October 11. He was 68 years old. Mr. Lannan also was treasurer of the Allegheny Mortgage Co. and from 1919 until 1930 was president and general manager of the McKeesport and Youghiogheny Ice Co. He is survived by his widow, a son, and two daughters.

Confirm Billings Death

The Navy Department has confirmed the death of Lt. Comm. Edmund Billings, formerly reported missing in action following the battle of Savo Island on August 9, 1942 (as reported in the October, 1942, issue of RUBBER AGE). Lt. Comm. Billings, vice-president and a director of Godfrey L. Cabot, Inc., when he was called to action as a member of the U. S. Naval Reserve in January, 1941, was 44 years old. He was born in Boston, Mass., and was graduated from Harvard in 1919. During the first World War he was in the Chemical Warfare Service.

U. S. Rubber plans to increase its capacity for the production of asbestos fabrics used principally in war products by 50%. Production will be increased by expanding the asbestos facilities of the Stark Mills, operated by the company's textile division in Hogansville, Georgia.

Typewriter platens for ordinary typewriters and power roll covers for electromatic typewriters are now being made from Koroseal, according to Goodrich. Jar sealing rings are also being made of Koroseal, as well as from "a vulcanizable linseed oil compound combined with other ingredients."

New Channel Tread Tire

A new channel tread tire which enables pilots to land fast planes on ice and snow with an increased safety margin has been announced by the Firestone Tire & Rubber Co. Unprecedented traction is said to be given the new tire by large and sharp steel lugs which grip ice and hard-packed snow with the firmness of cleets. The tire also performs well in soft snow, the channel tread actually packing soft snow under the tire, thus giving added flotation as well as good traction. The lugs fit in the high-projecting shoulders of the tire, extending from the tread through the shoulders to the side of the tires, where they are bolted in place. Because the lugs in the tire are removable, it is adaptable to all-year round use.

Boston to Hear Hayden

O. M. Hayden, Assistant Manager of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, will be the principal speaker at the meeting of the Boston Group, Rubber Division, A.C.S., scheduled to be held on Friday, October 22, at the Parker House in Boston, Mass. Mr. Hayden will discuss "Latest Developments in Neoprene Compounding Practices." An interesting talk on the Japan of yesterday, today and tomorrow, will also be given by Charles Winthrop Copp, a teacher in Japan's national schools for more than 20 years. Tickets for the meeting are $3.00 to members and $3.50 for non-members. Reservations should be made with the group's secretary, Harry A. Atwater, c/o Hood Rubber Co., Watertown, Mass.

Butadiene Fire Investigation

R. W. Hendricks, hydraulic engineer of Underwriters Laboratories, Inc., Chicago, has been loaned to the Rubber Reserve Co. where he will be in charge of investigation and experiments to determine new and better ways of controlling and extinguishing fires in plants where butadiene is stored. An outdoor testing station for this purpose is now being constructed at Baytown, Texas, adjacent to the butadiene plant operated by Humble Oil and the copolymer plant operated by General Tire.

Resins and Lacquer Emulsions

—Developed to meet the need for *Substitutes*, *Extenders* and *Modifiers* for LATEX and RECLAIM

VULPRENES—Solid Modifiers and Substitutes

—for CRUDE, RECLAIMED and SYNTHETIC RUBBER

●

RESIN AND LACQUER EMULSIONS—These emulsions are being used today as *Latex Modifiers* and *Complete Latex Replacements* to extend, thicken, stabilize, increase penetration, improve resistance to acids, oils and solvents; in *Coatings* to produce adherent pigmented or clear coatings on paper, fabric, and rubber and as intermediate coats for lacquer on rubberized cloth; in *Rubberizing* textiles; in *Latex Treated Papers* to increase strength and improve ageing; in *Adhesives*, for paper, for leather to cloth, and cloth to cloth.

VULPRENE SOLUTIONS AND DISPERSIONS. These forms of Vulprene are being used for adhesive tapes, marking paper, water-resistant coatings, etc. *Vulprene Latex* is used as a latex extender particularly as shoe adhesives, for impregnation of paper, can sealing compounds and coating materials. Modifiers for neoprene and Buna S.

ALKYD 18- -an alkyd type resin emulsion which is non-yellowing and non-oxidizing. Film is water-white and non-tacky. Preferred where slight oxidizing action may be considered harmful to rubber. Extender for latex and reclaim in coating, combining and impregnating process.

EMULSION 58-8—a series of emulsified elastomers containing up to 65% solids. Recommended for use as full latex replacements in impregnation and combining.

PIGMENT BASES—concentrated aqueous dispersions of pigments in resin bases, available in all shades and viscosities, suitable for spreading, spraying, etc.

Also Acrylic, Vinyl, Maleic, Phenolic, Hydrocarbon, Ethyl Cellulose, Cellulose Acetate and Nitrate emulsions and solutions for various applications.

●

AMERICAN RESINOUS CHEMICALS CORPORATION

Rubber Substitutes • ***Rubber Synthetics*** • ***Resin, Lacquer Emulsions***

MAIN OFFICE and LABORATORIES

PEABODY, MASS.

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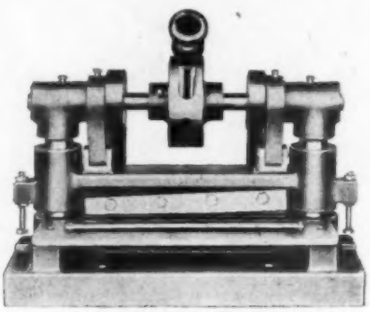
NEW EQUIPMENT

Di-Acro Shear No. 2

Accurate shearing, squaring, slitting, stripping or notching of various materials, including rubber and plastics, is claimed for an improved cutting machine manufactured by the O'Neill-Irwin Manufacturing Co., Minneapolis, Minn. Known as Di-Acro Shear No. 2



the model has a maximum shearing width of 9 inches and accuracy is guaranteed by the manufacturer to a tolerance of .001-inch in all duplicated work.

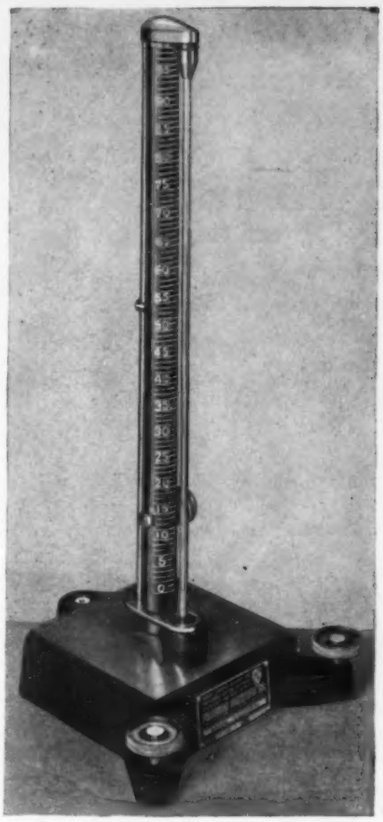
Both shear blades of the improved cutting tool are of heavy tool steel, aligned with a wide range of adjustment provided for wear and cutting control. The blades are reversible offering double service without resharpening. The main bearings are provided with adjustment for wear and blade alignment, while the automatic spring charged action is said to provide faster operation and increased productive output.

The Di-Acro Shear can be quickly arranged for shearing, squaring, slitting, stripping or notching, and will handle all ductile and pliable materials, frequently eliminating the preparation expense and time delay of preparing blanking and forming dies.

Taylor Pneumatic Set Controller

Based on an increasing demand for a dependable controller whose control point, as indicated by a set pointer, would be automatically adjusted by variations in output air pressure from another remotely located instrument, which may be an indicator, controller or recorder, the Taylor Instrument Companies, Rochester, N. Y., has introduced a Pneumatic Set Controller. The new controller, developed in both indicating and recording forms, is fundamentally a Fulscope Controller with an additional unit to convert changes in input air pressure into linear movements of the set pointer. The magnitude of the linear set pointer movement per pound change in input air pressure is governed by the setting of the adjustment dial provided in this unit. The unit also provides for set pointer adjustments in either direction for an increase in input air pressure, and for limiting the travel of the set pointer within given limits. The instrument is also equipped with a manual set pointer adjustment feature.

The Pneumatic Set Controller is said to have proven its versatility in a large variety of control applications where the set pointer of the controlling mechanism



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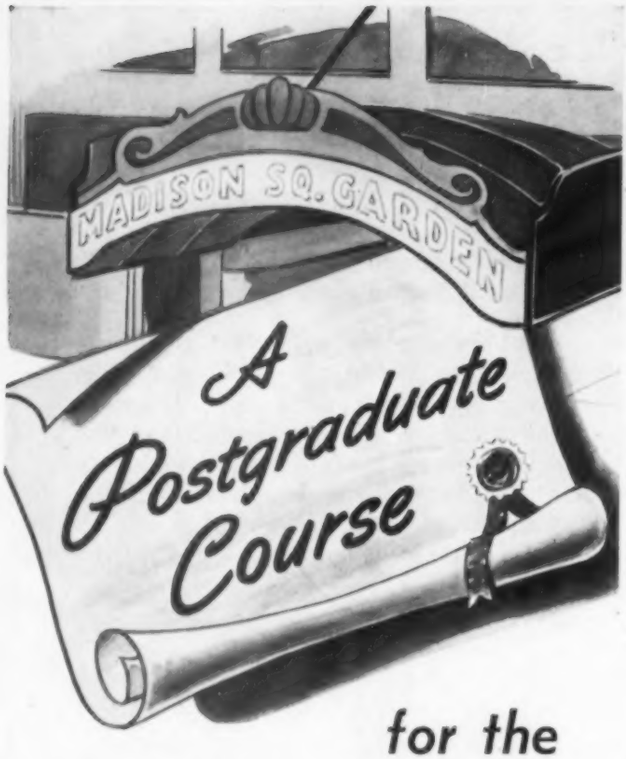

for the

RUBBER INDUSTRY

Under one roof, in Madison Square Garden, New York, this year's exposition of Chemical Industries will present a remarkable educational opportunity. There, during the week of December 6-11, 1943, members of the phenomenally-growing synthetic rubber industry will find the equivalent of a postgraduate course in chemistry and chemical engineering applied to their own problems.

Available here will be a wealth of ideas for speeding production in the new synthetic rubber plants that will supply the rubber products to meet the needs of war and those of the victorious peace to come. Synthetic Rubber—a brand-new industry—is bound to undergo changes—many foreshadowed by the exhibits at the Exposition.

Plan to use to the utmost this arsenal of workable ideas. You will find more "show-how," more factual data, because this year's Exposition is more concentrated than ever before. It will be an information center, manned by technical representatives of the country's leading producers of raw materials, and builders of processing equipment.

Admission to the Exposition of Chemical Industries is by invitation and registration. As the general public is not admitted, you will find here every facility for a thorough-going study of the chemical and engineering developments of prime interest to you. By all means come—and bring your associates.

19th EXPOSITION OF CHEMICAL INDUSTRIES

MADISON SQUARE GARDEN • NEW YORK

DEC. 6-11, 1943

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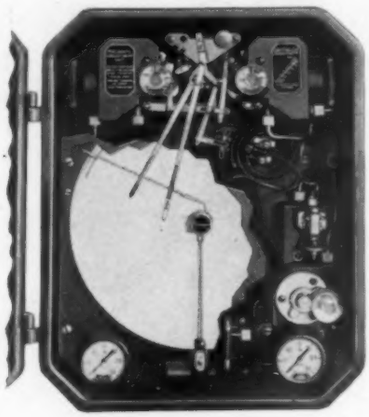
must be automatically and continuously adjusted in relation to variations in some other controlled or uncontrolled process variable. In the production of synthetic rubber it is being used to control the jacket water temperature of reactors to maintain constant product temperatures. It is also being used to control the speed of



internal combustion engine driven air compressors to maintain constant suction or discharge pressures. In air conditioning work Pneumatic Set makes is possible to keep a fixed temperature ratio between outdoors and indoors, thus eliminating the shock which is experienced when there is too great a variation between the two. These are but a few of the applications to which the new highly versatile instrument can be used to advantage.

New Industrial Chilling Unit

A new industrial chilling machine to meet testing requirements of —70° F., which is finding application in connection with the testing of rubber and synthetic rubber products, has been introduced by the Deepfreeze Division of the Motor Products Corp., 2301 Davis St., North Chicago, Ill. Known as Deepfreeze Model D-70, the new unit has a heat absorption capacity of 800 B.T.U.'s per hour.

The unit features a double-walled cold cylinder which entirely surrounds the walls of the chilling compartment. The cylinder has an 18-inch diameter and is 30 inches deep, affording over 24 square feet of primary freezing surface. Two motors are furnished, ½ and ⅓ h.p., 220 volt, single phase, 60 cycle, of standard make, equipped with built-in thermal overload. The two compressors are of the water-cooled head type. Four inches of Santocel, said to have 2½ times the insulating quality of the next best insulation, are used for insulation.

Deepfreeze Model D-70 is 37 inches high, 67 inches long, and 33 inches wide. Its temperature control is adjustable from atmosphere to —70° F. Its thermal capacity, as stated, is 800 B.T.U.'s per hour at all temperatures from 0 to —70° F., when work is immersed in a convection fluid in the chilling chamber. The expansion valve, of special make, is electrically controlled. The dehydrator is charged with silica gel. Automobile feeder steel is used for the body of the unit, the shipping weight of which is approximately 600 pounds.

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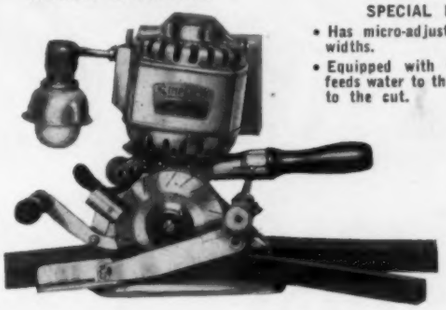

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- Has micro-adjustment for accurate widths.
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- Automatic sharpener device keeps knife keen and sharp.
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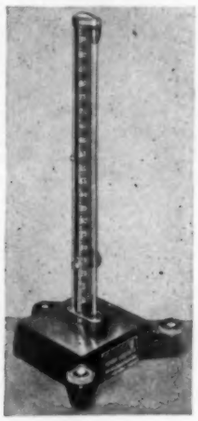
Precision-Scientific Resiliometer

The Precision Scientific Co., 1736 No. Springfield Ave., Chicago 47, Ill., is now in production on the Bashore Resiliometer, the manufacturing and sales rights to which it recently acquired from the Testing Equipment Co., of Manheim, Penna. This testing device, which determines the resiliency of rubber and extensible plastic materials by the rebound of a



weighted plunger dropped from a predetermined height on the test specimen, has proven useful in the development of compounds, in measuring rate and state of cure, in matching competitive compounds, in control tests on cured and uncured samples of mixed and masterbatches, in comparing heat build-up, and in measuring plasticity of uncured compounds and masticated rubber. The resiliency of any material is often a key to other important properties.

New Portable pH Indicator

A new portable universal pH indicator which, direct reading with glass, hydrogen and quinhydrone electrodes, combines the qualities of its predecessor with several new advantages, has been announced by the Leeds & Northrup Co., Philadelphia, Penna.

Advantages claimed for the new instrument, known as the Model 7663-A1 Universal pH Indicator, include: (1) self-contained electrodes of new and improved design; (2) in addition to the standard 50 ml sample beaker, a small volume holder for samples of approximately 2 ml; (3) a reduction in the number of knobs and switches used in standardizing and measuring; (4) a polarity reversing switch for the volt range.

Compactly housed in a light weight carrying case, it is said to be easily accessible because of the quickly removable lid, and the hinged end of the case. The convenience of this portable indicator is further enhanced by the 15-inch leads supplied with it, which make it possible to use the electrodes outside of the case.

Overtime as well as straight time payroll calculations can be figured promptly and accurately with a new and improved model **payroll calculator** now being manufactured by the Berger-Brickner Co., 433 So. Spring St., Los Angeles 13, Calif.

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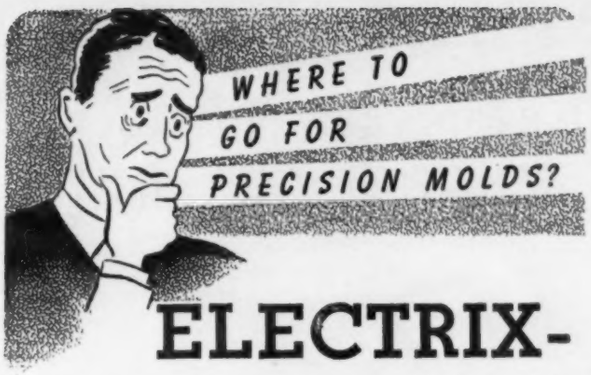

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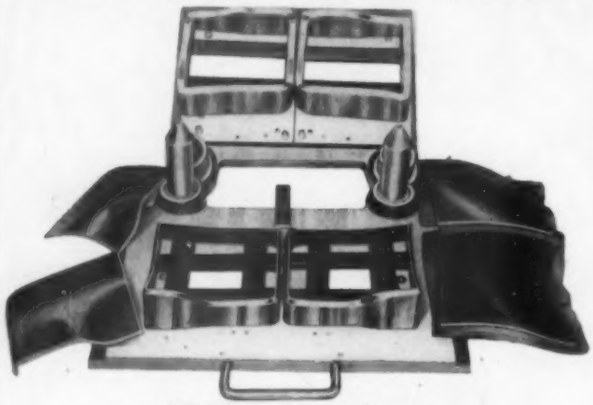

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REVIEWS

BOOKS

Slide Rule Simplified. By Charles O. Harris. Published by American Technical Society, Drexel Av. at 58th St., Chicago, Ill. 5½ x 8¼ in. 266 pp. $2.50. ($3.50 with special slide rule, not sold separately.)

Although slide rules are indispensable tools to the engineer and scientist, who use them constantly during their daily work, it is held in awe by many others who could well profit from its use, such as estimators, merchants, accountants, manufacturers and many business men. One of the primary aims of this book is to dispel the idea that the slide rule is difficult to master and replace it with the certain knowledge that anyone who will study and practice can learn to use the slide rule with ease and confidence. The book contains many pictorial views of the slide rule, and points discussed are clearly indicated. Explanation of all steps include every figure or calculation necessary to obtain the desired results. A decided feature is the section added to most chapters which shows the basis or fundamental principles for and of all slide rule functions. There are 14 chapters in all, plus a comprehensive subject index.

BOOKLETS, CATALOG, Etc.

Atomite in Natural and Synthetic Rubber. Thompson, Weinman & Co., Inc., 52 Vanderbilt Ave., New York, N. Y. 8¾ x 11½ in. 24 pp.

As indicated by its title, this attractive, two-color brochure covers the use of Atomite (water-ground natural calcium carbonate) in natural and synthetic rubber compounds. The effect of particle size in rubber is first discussed, with comparisons drawn between the relative particle sizes in Atomite and dry ground limestone and particle size distribution analyses of the same two materials. A number of compounds are then presented containing Atomite, with test data given in all instances. The formulas presented cover wire insulation, carcass stock, mechanical goods, and oil-resisting Hycar OR-15 stocks. Electron micrographs of Atomite and a typical precipitated calcium carbonate are shown for comparison. The manufacture of Atomite is discussed.

•

Mechanical Properties of Plexiglas. Rohm & Haas Co., Washington Square, Philadelphia, Penna. 5½ x 8 in. 92 pp.

The mechanical properties of Plexiglas are presented in tabulated form in this comprehensive booklet. Details of the test methods used as well as the results so that engineers and designers may properly evaluate and interpret the given data are included. The booklet also covers applications of specific properties. For instance, specific gravity measurements are given, the test method detailed, and applications of the property to aircraft and naval construction are discussed. Complete with illustrations and appropriate tables, the booklet is a helpful guide to the successful application of Plexiglas.

•

Felt Facts. Felt Association, Inc., 366 Madison Ave., New York 17, N. Y. 8 x 10¼ in. 24 pp.

Written in simple, non-technical style, this booklet tells the story of the manufacture and of some of the myriad uses of wool felt. Attention is called in the booklet to the many applications of wool felt in the engineering and mechanical fields as an alternate for rubber, cork, certain fabrics and plastics, and other materials. The modern manufacture of the material is interestingly portrayed in sixteen drawings.

Witco M.R. in GR-S (Buna S). (Report No. 43-4). Witco Research Laboratories, 6200 W. 51st St., Chicago, Ill. 8½ x 11 in. 20 pp.

Data indicating the effect of mineral rubber on the physical characteristics of GR-S compounds is presented in this laboratory report. Information on the properties which may be obtained by using larger amounts of channel black and larger amounts of sulfur in conjunction with various amounts of mineral rubber is also presented. Data given on a typical GR-S tread stock covers the effect of sulfur, stress-strain, tear resistance, elongation, flex-cracking, tensile, hardness (befor and after aging), and resilience. Suggestions for the replacement of medium thermal black or semi-reinforcing furnace black with mineral rubber in GR-S compounds are contained in the report.

•

Interaction Between Rubber and Liquids. IV. Factors Governing the Absorption of Oil by Rubber. (Publication No. 36). By G. Gee. British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C. 3, England. 5½ x 8½ in. 16 pp.

This booklet, a reprint from a recent issue of *I.R.I. Transactions*, points out the main factors governing the absorption of liquids by rubber and shows how the swelling of a given rubber in a given liquid may be roughly predicted. Although a complete quantitative theory must await much more extensive experimental work than is yet available, the author concludes that (1) a rubber cannot be made oil-resistant by physical compounding, and (2) the chemical structures likely to give oil-resisting rubbers can be predicted with some confidence.

•

Electronics at Work. (Booklet B-3264). Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penna. 11 x 8½ in. 44 pp.

Electronic applications in industry, in the war, in medicine and in the home are described and illustrated in this booklet. Typical applications shown include resistance welding control for sewing airplane parts together at 1800 stitches per minute, high-frequency induction heating units for plastic molding, and industrial x-ray units for "inside" inspection of vital metal parts. Various types of electronic tubes for such applications as industrial control, diathermy, power conversion, x-ray and radio are illustrated and the primary use of each identified.

•

PVA—Properties, Uses and Applications. R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 8½ x 11 in. 8 pp.

The general properties, uses and applications of PVA—polyvinyl alcohol—are discussed in this technical bulletin, with emphasis on the latter The specific applications in the paper, leather and cosmetic industries are outlined, with brief reference made to general applications, including adhesives, protective films, molded products, extruded products, emulsions, gloves, insecticides, and photographic films. A table showing the effect of various solvents on the physical properties of extruded PVA tubing compounds is included.

•

Dispersed Tysonite. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 8½ x 11¼ in. 8 pp.

The manufacture, characteristics and properties of Dispersed Tysonite, which is not restricted as to its use and which may be substituted for latex and dispersed reclaim in many places, are briefly described in this laboratory report. A few suggested applications, including upholstery backing, rug backing and combining compounds, are discussed. The material may also be used as an adhesive, as a binder in pulp boards, and as a binder for curled hair and felt.

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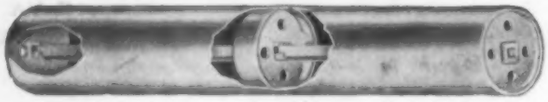

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640 So. 28th St. Milwaukee, Wis.

REVIEWS (CONT'D)

Statex B. (Bulletin No. 127). Binney & Smith Co., 41 East 42nd St., New York, N. Y. 8½ x 11 in. 2 pp.

The previous bulletin on Statex B indicated that that material makes possible fully reinforced GR-S stocks of given hardness values with less polymer and still develops higher resilience than can be accomplished with easy processing channel carbons. The current bulletin indicates that this better resilience translates itself into lower heat build-up. Two tables, covering constant deflection and constant load, respectively, are presented to bear out the new belief. According to these tables, under conditions either of constant deflection or constant load more highly loaded Statex B stocks are superior to the corresponding ones containing easy processing channel black.

●

Electric Instruments: Principles of Operation. (GET-1173). General Electric Co., Schenectady, N. Y. 8 x 10½ in. 20 pp.

This new publication presents a concise discussion of the characteristics of electric instruments, what makes them operate, and the individual limitations of the various types. It is pointed out that the use of electricity in manufacturing processes has become so general that the important question of whether it is being used in the most economical way is sometimes overlooked. It is suggested that a study of the construction and application of electric instruments invariably points the way to lower costs and improved manufacturing methods.

●

Care and Maintenance of Combat Tires. B. F. Goodrich Co., Akron, Ohio. 8½ x 11 in. 48 pp.

This booklet represents Section I of the Goodrich U. S. Army Training School Manual which has now been made available for general distribution. It provides information on the proper care, preventative maintenance and servicing of tires, tubes, endless and block tracks and other rubber products of a military nature, such information being of the utmost importance to Army men operating motorized equipment. A second section on the care and maintenance of endless rubber band tracks for half-track vehicles will be made available shortly.

●

How to Make Your Safety Equipment Last Longer. Mine Safety Appliances Co., Braddock, Thomas and Meade Streets, Pittsburgh, Penna. 6 x 9 in. 32 pp.

Published in the interest of conservation, this booklet details the practical "do's and don'ts" of safety equipment care for key personnel, in a form readily adaptable for instruction of equipment users. A section on sterilization for masks and respirators is included. The booklet, which covers protective hats, gas instruments and safety clothing, in addition to masks and respirators, is illustrated throughout by marginal drawings pertinent to the text.

●

How to Teach Fire Fighting. Walter Kidde & Co., Inc., Belleville, N. J. 8½ x 11 in. 16 pp.

This booklet is designed to aid factory executives in instructing employees in fire-extinguishing techniques. It describes the classification of various types of fires, the kind of extinguisher best suited to each, and the methods of setting up demonstrations in order to teach the proper use of each type of extinguisher.

●

A four-page folder (Bulletin 116) has been issued by the Edge Moor Iron Works, Inc., Edge Moor, Delaware, describing its capabilities for producing *process equipment for the chemical industries.* The company specializes in welded fabrication to specifications.

●

A booklet containing *wartime driving instructions,* under low mileage-low speed operating restrictions, has been issued by the Automotive Council for War Production, New Center Building, Detroit 2, Mich.

Laboratory Utilities. (Catalog 600). Precision Scientific Co., 1750 No. Springfield Ave., Chicago, Ill. 8½ x 11 in. 112 pp.

This catalog represents a handy, condensed presentation of up-to-the-minute data on laboratory utilities of all kinds, including autoclaves, burners, centrifuges, digestion and extraction apparatus, distillation equipment, heaters, hot plates, sieves, stirrers, shakers, titration illuminators, and water stills. Many new "wrinkles" in familiar items are shown, while dozens of practical ideas for stepping up laboratory efficiency are given. A complete alphabetical index, making the location of any particular item an easy matter, is included.

•

Westco Industrial Pumps. Pomona Pump Co. Division of Joshua Hendy Iron Works, St. Louis, Mo. 8½ x 11 in. 60 pp.

In addition to furnishing the complete story about each of the company's Westco pumps, this catalog includes a brief description of its line of Pomona pumps, many of which are used in the rubber manufacturing industry. Specifications are furnished in the case of each pump, with performance tables accompanying most of the specifications. Operation of the various types of pumps described is clearly shown through the use of flow charts.

BRIEFS . . . .

Pneumix air-motored agitators in use on different types of work, including the preparation of synthetic rubber, are shown in a new booklet issued by the Eclipse Air Brush Co., 400 Park Ave., Newark 7, N. J. Entitled *Pneumix in Action,* the booklet is a companion piece to the company's catalog on its spray equipment.

•

The Farval Corp., Cleveland 4, Ohio, has published an 8-page folder (Bulletin No. 15) describing its *Multival lubricating system,* described as an improved method of providing positive lubrication to a group of bearings from a central distributing block.

•

An interesting pamphlet under the title of *Wartime Report on Lignum-Vitae* has been issued by the Lignum-Vitae Products Corp., Jersey City, N. J. It describes many diversified and some heretofore unknown applications of the material in the war effort as well as potential uses for the post-war period.

•

A new 40-page booklet representing a comprehensive presentation of *three types of Tag controllers*—on-off, throttling and automatic reset—has been made available by the C. J. Tagliabue Mfg. Co., Brooklyn, N. Y. Actual installation photographs are used to indicate the work some of these instruments are doing. Ask for Catalog No. 1200.

•

The various ways in which *Flori fabricated piping* can be used for conveying gas, air, steam, oil and chemicals, and for construction purposes, are described and illustrated in an attractive booklet recently issued by the Flori Pipe Co., St. Louis, Mo. Prices for various types and sizes of fabricated piping are included.

Several interesting features are claimed for a new **electronic temperature indicator** recently developed by the North American Phillips Co., Inc., 419 Fourth Ave., New York City. A switch on the front panel allows instantaneous selection of three temperature "spread ranges", giving good reading accuracy. The standard limits of the instrument are from —212° F. to 1832° F., with a normal accuracy of plus or minus 2%.

Ask about the MOONEY PLASTOMETER

We are now making this well-known tester for standard tests on GR-S. Also 60 other *Scott Testers for tensile, hysteresis, adhesion, flexing, state-of-cure, etc., etc.

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•

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"PIONEERS OF THE INDUSTRY"

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, Oct. 13, 1943

Crude Rubber

INDICATIVE of increased effort to secure larger supplies of crude rubber from the Western Hemisphere is the recent announcement that special schools for tappers are being set in various Latin American countries under the auspices of the Rubber Reserve Co. Students at these schools, paid while learning, are taught methods of getting the maximum yield for each tapping, with special tapping knives used in place of the machetes traditionally favored by the South American native. These tappers are also taught how to climb trees so that they can tap hitherto untouched latex areas. After "graduating" from the school, the tapper is sent into the jungles as an instructor.

An early supply of cryptostegia rubber from Haiti, where some 100,000 acres are being put under cultivation, is now expected. According to word recently received from Shada, the organization in charge of rubber development in Haiti, tapping of the cryptostegia vine has already been started and a new tapping method evolved. This method calls for the grouping of 10 to 12 stems of the vine together, with the latex flow being directed along a single channel into half-pint milk bottles, being used instead of the regular tapping cups. About 3,000 tons of cryptostegia will be produced during 1944.

Also indicative of the keen search for rubber to supplement the nation's rapidly dwindling stockpile, is the report from the Department of Agriculture that between 1500 and 2,000 tons of wild guayule shrub have been located in Southwestern Texas and contracts have already been let for the collection of these shrubs, which will be sent to Salinas, California, for processing. Plans have also been made to leave sufficient guayule on the Texas range to insure future reproduction of the plant.

Prices shown below are those set by the Rubber Reserve Company:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X	22½	40
Thick Pale Latex Crepe, 1X	22½	40
Thin Pale Latex Crepe, 1X	22½	40
Thick Brown Crepe, 1X	21⅜	38⅞
Thin Brown Crepe, 1X	21⅜	38⅞
Thick Remilled Blankets, #1	21⅜	38⅞
Rolled Brown or Flat Bark	18	35½
Smoked Blankets, #1	21⅜	38⅝
Claro Brand 1XRSS	22½	40
Sole Crepe Trimmings	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude	15	29
Cut Fines, Crude	15½	29¾
Cut Fines, Washed & Dried	22½	40
Upriver Coarse, Crude	12⅜	26⅛
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11⅝	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17⅜	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¾	23¾
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots	27¾	45¼
Heat-Concentrated, Carload Drums	29½	47

C, for Civilian Use; N-C, for Non-Civilian Use.

Scrap Rubber

Although the movement of scrap rubber to consuming channels has been somewhat lighter in the past two months than it has been in previous months, requirements of reclaimers are still well taken care of and the trade continues to maintain the same buying levels that existed all summer. Agents of Rubber Reserve continue to buy mixed tires at $10 per ton, passenger tires at $15 per ton, and inner tubes at $120 per ton. There is also a demand for air-brake hose scrap, which brings $25 per ton. Despite the rapidly increasing supplies of government synthetic rubber, there is still a keen demand for scrap rubber, and this situation is expected to continue for some time to come. Experiments on the proper sorting of synthetic scrap are constantly under way. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¼
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @ .44
Peeler, carded, 23/4/3	lb.	.44½ @ .45
Peeler, carded, 15/3/3	lb.	.41½ @ .42
Peeler, carded, 15/4/2	lb.	.41½ @ .42
Peeler, carded, 13/3/3	lb.	.40½ @ .41
CHAFERS		
Carded, American, 1⅛"	lb.	.43½ @ .44
Carded, American, 1"	lb.	.39½ @ .48

Sheetings

48x40	36 in.	5.50	lb.	—	@ 7.818
40x40	36 in.	6.15	lb.	—	@ 6.991
40x36	36 in.	6.50	lb.	—	@ 6.615
48x48	40 in.	2.50	lb.	—	@16.200
48x48	40 in.	2.85	lb.	—	@14.210
56x60	40 in.	3.60	lb.	—	@11.944
48x44	40 in.	3.75	lb.	—	@11.066

Note: Prices shown above are ceiling prices set by order of the O.P.A. Quotations are based on an average price of 15-16-inch middling cotton of 20.37c at the ten designated southern markets.

Cotton

The price of middling uplands on the Cotton Exchange has swung in the very narrow range of 26 points since our last report (September 14), high for the period being 21.23 on September 21 and low 20.97 on September 15. The average price for the month of September was 21.10, based on 25 trading days. Although the trading range was narrow, the market was quite erratic, moving up and down regularly from day to day. At no time was there any startling rise or fall in the price structure, the trade seeming to be hesitant about either buying or selling. In mid-September there were a number of bullish factors, including a weather threat to the cotton crop and the added strength witnesses in the stock market, which sent the price upward for a spell, but liquidation and hedging soon brought it down again. On October 9 the Crop Reporting Board of the Department of Agriculture estimated the cotton crop as of October 1 at 11,478,000 bales, slightly lower than previous estimates. Quotations for middling uplands on the Exchange follow:

	Sept. 14	October 13		
	Close	High	Low	Close
October	20.36	20.40	20.40	20.40
December	20.10	20.20	20.14	20.17
March	19.91	20.05	19.99	20.00

Reclaimed Rubber

Reclaimers report that a steadily increasing amount of synthetic rubber scrap is beginning to reach their factories, with the result that a completely new series of reclaim types containing varying amounts of synthetic rubber will soon reach the market. Steps are being taken in several quarters to standardize these new types as much as possible, and the Rubber Reclaimers Association will probably issue a special bulletin on the subject. The fact that manufacturers of camelback are now compelled to use appreciably significant amounts of GR-S in most grades of camelback means that still larger supplies of synthetic scrap will reach the reclaimers with each passing month. In the meantime, the reclaimers state that supplies of normal scrap are still plentiful. Prices shown below are ceilings on typical grades of reclaim:

Shoe				
Unwashed	lb.	.07	@	.07¼
Tube				
Black Tube	lb.	.11¼	@	.11½
Red Tube	lb.	.12	@	.12¼
Tires				
Black (acid process)	lb.	.07½	@	.07¾
Black, selected tires	lb	.06½	@	.06¾
Truck, Heavy Gravity	lb.	.08½	@	.08¾
Miscellaneous				
Mechanical blends	lb.	.04½	@	.05½
White	lb.	.13	@	.13¼

Ducks

Enameling (single filling)	lb.	—	@	.44¼
Belting and Hose	lb.	—	@	.39
Single filling, A grade	lb.	—	@	.19¼
Double filling, A grade	lb.	—	@	.20¼

CHEMICAL MARKETS

New York, Sept. 14, 1943
All Prices F.O.B. Works

ACCELERATORS

Organic

A-1 (Thiocarbanilid)	lb.	.28 @	.33
A-10	lb.	.36 @	42
A-19	lb.	.52 @	.65
A-32	lb.	.60 @	.70
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.43 @	.45
Beutene	lb.	.59 @	.64
B-J-F	lb.	.38 @	.43
Butyl Zimate	lb.	— @	1.13
Captax	lb.	.38 @	.40
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.36
El-Sixty	lb.	.40 @	.47
Ethyl Zimate	lb.	— @	1.13
Ethylidine aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.39 @	.48
Hepteen	lb.	.34 @	.39
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Ledate	lb.	— @	1.48
Methyl Tuads	lb.	— @	1.53
Methyl Zimate	lb.	— @	1.23
Monex	lb.	— @	1.53
Pentex	lb.	.74 @	.84
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.63
R & R 50-D	lb.	.42 @	.43
R-2 Crystals	lb.	— @	1.55
Rotax	lb.	.48 @	.50
Safex	lb.	1.15 @	1.25
Santocure	lb.	.60 @	.67
Selenac	lb.	— @	1.98
SPDX	lb.	.70 @	.75
Super-Sulfur No. 2	lb.	.13 @	.15
Thiocarbanilid, drums	lb.	.28 @	.33
Thiurad	lb.	— @	1.53
Trimene	lb.	.54 @	.64
base	lb.	1.03 @	1.18
Triphenylguanidine	lb.	.45 @	—
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.50 @	.57
Blend B	lb.	.50 @	.57
Blend C	lb.	.48 @	.55
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—

Inorganic

Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)

Blues [b]			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.17 @	.27
Browns [b]			
Mapico	lb.	.1135@	—
Umber, Turkey	lb.	.04¼@	—
Greens [b]			
Chrome	lb.	— @	.25
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¼@	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.096 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼@	—
Whites [b]			
Cryptone No. 19	lb.	.0560@	.0585
Cryptone CB No. 21	lb.	.0560@	.0585
Cryptone ZS-800	lb.	.0825@	.0850
Lithopone:			
Albalith	lb.	.04¼@	.04½
Astrolith	lb.	.04¼@	.04½
Azolith	lb.	.04¼@	.04½
Ray-cal	lb.	.05½@	.05¾
Rayox	lb.	.14½@	.15¼
Titanox A	lb.	.14½@	.14¾
Titanox B	lb.	.05¼@	.06
Titanox C	lb.	.05½@	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼@	.07½
Anaconda, lead free	lb.	.07¼@	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼@	.07½
XX Red—4	lb.	.07¼@	.07½
XX Red—72	lb.	.07¼@	.07½
XX Red—103	lb.	.07¼@	.07½
Kadox, black label—15	lb.	.07¼@	.07½
Red label—17	lb.	.07¼@	.07½
St. Joe, black label	lb.	.07¼@	.07½
green label	lb.	.07¼@	.07½
red label	lb	.07¼@	.07½
U. S. P.—7, bbls.	lb.	.10½@	.10¾
Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½@	.09¾
Green seal—8	lb.	.09 @	.09¼
Red seal—9	lb.	.08½@	.08¾
Yellows [b]			
Cadmolith	lb.	.55 @	.60
Chrome	lb.	— @	.50
Mapico	lb.	.071 @	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

BLACKS

(In bags, carload lots)

Aerfloted Arrow	.0355@	—
Atlantic	.0355@	—
Certified	.0355@	—
Certified Spheron	.0355@	—
Channel "S"	.12 @	—
Continental	.0355@	—
Disperso	.0355@	—
Dixiedensed	.0355@	—
Dixiedensed 66	.0355@	—
Excello	.0355@	—
Furnex	.03½@	.06
Furnex Beads	.03½@	.06
Gastex	.03½@	.06
Kosmobile	.0355@	—
Kosmobile 66	.0355@	—
Kosmos-Dixie 20	.03½@	.06
Micronex (Amarillo)	.0355@	—
Micronex Beads (Amarillo)	.0355@	—
Pelletex	.03½@	.06
P-33	.0475@	—
Shell Carbon (Del. Midwest)	.0240@	—
Sterling	.035 @	—
Supreme	.0355@	—
Thermax	.0225@	—
Thermax "S"	.0675@	—
Wyex	.0355@	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	@24.50
99½%-300	ton	—	@16.50
86-90%-300	ton	—	@13.50
Asbestine	ton	16.50	@20.00
Atomite	ton	—	@27.50
Barium carbonate (98-100%)	ton	47.00	@49.00
Barytes	ton	25.35	@36.00
Bentonite	ton	11.00	@16.00
Blanc fixe, dry	ton	60.00	@67.50
Calcene	ton	37.50	@43.00
Catalpo (fact)	lb.	.02 @	—
Chalk, precipitated			
Suprex white	ton	32.50	@45.00
Clay, Aerfloted, Suprex	ton	10.00	@22.50
Aerfloted Paragon	ton	10.00	@22.50
Crown	ton	10.00	@ —
Dixie	ton	—	@10.00
Kaolloid	ton	—	@ 9.00
Langford	ton	—	@ 8.50
McNamee	ton	—	@10.00
Par	ton	—	@10.00
Witco	ton	10.00	@ —
Kalite No. 1	ton	—	@26.00
Kalite No. 3	ton	—	@36.00
Kalvan	ton	—	@100.00
Kalvan "S"	lb.	—	@ .09½
Keystone white	ton	—	@14.00
Magnesium carbonate	lb.	.06¼	@ —
Mineralite	ton	—	@30.00
Pyrax A	ton	—	@ 7.50
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Rubberol	lb.	—	@ .17½
Silene EF (calcium silicate)	lb.	.055	@ .06
Snowflake white	ton	—	@16.00
Talc, domestic	ton	17.00	@25.00
Whiting, commercial	ton	16.00	@26.00
Witco	ton	6.00	@ —
Witcal	ton	—	@100.00
Witcarb R-12	ton	—	@40.00
Wood Flour (100 mesh)	ton	30.00	@32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	@ —
Black Diamond	ton	25.00	@ —
Hard Hydrocarbon	ton	25.00	@27.00
MilliMar	lb.	—	@ .05½

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00	@ 4.50
Rodo #10	lb.	5.00	@ 5.50
Curodex 19	lb.	2.75	@ —
Curodex 188	lb.	3.50	@ —
Curodex 198	lb.	4.50	@ —
Para-Dors	lb.	4.50	@ —
Areaklene No. 375	lb.	.35	@ .50
Darvan (dispersing agent)	lb.	.30	@ .34
Santomerse S	lb.	.11	@ .25
Sponge Paste	lb.	—	@ .18
Sunproof	lb.	.22¾	@ .27¾
Tonox	lb.	.50	@ .59
Ty-Ply	gal.	6.75	@ 8.00
Unicel (blowing agent)	lb.	.50	@ —

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38	@ 3.63
Nitric, 36 degrees	cwt.	5.00	@ —
Acids, Fatty			
Laurex	lb.	.14¼	@ .17¼
SL #10	lb.	.12	@ .14
Stearex Beads	lb.	.10	@ .11
Stearite	lb.	.10	@ —
Alkalies			
Caustic Soda, 76%	cwt.	2.70	@ 5.7[illegible]
Soda Ash, 58%	cwt.	1.15	@ 2.98
Oils			
Degras, bbls.	lb.	.10	@ .12
Para-Flux	gal.	.17	@ .18
Para-Lube	lb.	.046	@ .048
Petrolatum, amber [b]	lb.	.03½	@ —
Pigmentaroil, tank cars	gal.	.20½	@ —
in drums	gal.	.26½	@ .27½
Pine, tanks	gal.	.55	@ —
Rosin Oil, cmpd.	gal.	.40	@ —
Rubberol	lb.	.13½	@ .14
Rubtack	lb.	.10	@ —
Seedine, c.l.	lb.	.07¼	@ —
Witco Palm Oil	lb.	—	@ —
Witco Softener No. 20	gal.	.20	@ —
Woburn No. 8, c.l.	lb.	.06	@ —
Resins and Pitches			
Pitch, Burgundy	lb.	.06	@ —
coal tar	ton	19.00	@22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt.	bbl.	—	@ 4.50
Pigmentar, tank cars	gal.	.20½	@ —
in drums	gal.	.26½	@ .27½
Retort Pine Tar, drums	gal.	.26½	@ .27½
Solvents			
Acetone, pure [a]	lb.	.07	@ —
Benzene, 90%, tank car	gal.	.14	@ —
Beta-Trichlorethane	gal.	—	@ .20
Bondogen	lb.	.98	@ 1.05
Carbon, bisulfide	lb.	.05	@ .08½
Carbon tetrachloride	gal.	.83	@ 1.27
Dichlorethylene	lb.	—	@ —
Dipentene, cml., drums	gal.	.48	@ .50
Ethylene dichloride	lb.	.07½	@ .08½
Plastogen	lb.	.07¾	@ .08
Reogen (drums)	lb.	.11½	@ .12
Rub-Sol	gal.	.09½	@ —
Trichlorethylene	lb.	.08	@ .09½
Turpentine, spirits	lb.	.78½	@ —
dest. dist., drums	gal.	.50	@ .55
Waxes			
Beeswax, white [b]	lb.	.58	@ —
Carnauba, yellow [b]	lb.	.83¼	@ —
Ceresin, white, dom.	lb.	.13½	@ .15
Montan, crude	lb.	—	@ —
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼	@ —
Refined, 123/125	lb.	.05¼	@ —

ANTI-OXIDANTS

Agerite Alba	lb.	1.95	@ 2.05
Gel	lb.	.52	@ .54
Hipar	lb.	.61	@ .63
Powder	lb.	.43	@ .45
Resin	lb.	.43	@ .45
Resin D	lb.	.43	@ .45
White	lb.	1.23	@ 1.33
Albasan	lb.	.69	@ .74
Antox	lb.	.54	@ .56
B-L-E	lb.	.43	@ .52
Flectol H	lb.	.43	@ .55
Flectol White	lb.	.89	@ 1.00
Neozone A, B, C, D, E	lb.	.43	@ .63
Oxynone	lb.	.77	@ .90
Retardex	lb.	.45	@ .48
Santoflex B	lb.	.43	@ .55
Santoflex BX	lb.	.56	@ .64
Santovar O	lb.	1.15	@ 1.40
S.C.R.	lb.	.33	@ .35
Stabilite	lb.	.52	@ .54
Stabilite Alba	lb.	.70	@ .75
VGB	lb.	.43	@ .52

EXTENDERS

Naftolen	lb.	.15	@ .20
Vanzak	gal.	.05	@ .06

LUBRICANTS—MOLD & RUBBER SURFACE

Areaklene	lb.	.35	@ .50
Cocoa Soapstock	lb.	.06	@ .08
Colite	gal.	.90	@ 1.15
Dipex	lb.	.06	@ .08
Glycerized Liquid Lubricant	gal.	—	@ 1.35
Lubrex	lb.	.25	@ .30
Mineralite	ton	—	@30.00
Sericite	ton	65.00	@75.00
Soap Tree Bark, cut, sifted	lb.	.06	@ .08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾	@ —
Black	lb.	.08½	@ .13
White	lb.	.09	@ .15
Brown	lb.	.10	@ .14
Neophax A	lb.	.16½	@ —

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.08	@ .12
Sulfur Chloride, yellow (drs.)	lb.	.03	@ .08
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55	@ —
Commercial (bags)	cwt.	2.20	@ —
Telloy	lb.	1.75	@ —
Vandex	lb.	1.75	@ —

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York 19, N. Y.

Chemicals and Compounding Materials —

ACCELERATORS—
El-Sixty; Ureka; Ureka C; Guantal; Santocure; DPG; Pip Pip; A-10; A-32; A-46; A-100; R-2 Crystals • ANTIOXIDANTS—Flectol H. White; Santoflex B, BX; Santovar A.
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

CARBON BLACK
A Grade for Every Requirement
CONTINENTAL "AAA"—Low heat generating, extremely easy processing. "AA"—Low heat generating, easy processing. "A"—Medium cure, medium processing. "D"—Standard Channel Black.
Continental Carbon Company
295 Madison Ave., New York, N. Y.

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

CARBON BLACK—Aerfloted
WYEX — TX — HX
Compressed — Compact (Dustless)
J. M. Huber, Inc.
460 West 34th St. New York

CHEMICALS
For Rubber — For Industry Generally
Accelerators — *Acids* — *Latex*
Antioxidants — *Oil of Myrbane* — *Lotol*
Specialties — *Aniline Oil* — *Dispersions*
NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 SIXTH AVE. NEW YORK

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 40 years.*
The Aluminum Flake Co.
Akron, Ohio

CARBON BLACK
"Atlantic" Carbon Blacks meet the exacting standards of modern rubber production.
Chas. Eneu Johnson & Co., Mfrs.
Distributed by
C. P. HALL CO.
Akron — Boston — Los Angeles — Chicago

CHEMICALS
For Natural & Synthetic Rubber
"PICCO" Brand—Plasticizers; Coumarone Resins; Reclaiming Oils, Coal Tar Naphthas.
Pennsylvania Industrial Chem. Corp.
Clairton Penna.

ALUMINUM HYDRATES
"Alorco" Hydrated Aluminas reinforcing pigments give many desirable properties to rubber. Send for sample.
ALUMINUM CO. OF AMERICA
1970 Gulf Bldg. Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CHEMICALS
A complete line of plasticizers, resins, substitutes, fillers, etc., for Synthetic. Natural and Reclaimed Rubber.
STANDARD CHEMICAL COMPANY
Akron Savings & Loan Bldg, Akron

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
Wishnick-Tumpeer, Inc.
295 Madison Ave., New York, N.Y.

CHEMICALS AND MINERAL
Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

CALCENE—SILENE EF
Two exclusive Columbia pigments proving exceptionally valuable to Rubber Compounders. Send for free data sheets.
PITTSBURGH PLATE GLASS CO.
COLUMBIA CHEMICAL DIV.
Grant Bldg., Pittsburgh (19), Pa.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street New York City

COAL TAR CHEMICALS
Coumarone Resins — Tack Producers
Resinous Oils — Dispersing Oils
Reclaiming Oils — Softeners
Solvents
The Neville Company
Neville Island, Pittsburgh, Penna.

CARBON BLACK-MICRONEX
The world's standard gas black; universally known as the "King of Rubber Pigments."
BINNEY & SMITH CO.
41 East 42nd St. New York City

Do you believe in Your Products?
Then you should believe in telling the rubber industry about them. The MARKET PLACE is the logical place to display your wares.

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Malrose, Mass.
Offices in New York, Akron, Chicago

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York 19, N. Y.

Chemicals and Compounding Materials (continued)

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

GASTEX
Special Process Reinforcing BLACK. Superior aging and oil resistant properties. Low permanent set.
Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
General Atlas Carbon Div.,
General Properties Co., Inc., Pampa, Texas

PARA-DORS—
overcome odors in rubber—effectively and at low cost.
GIVAUDAN-DELAWANNA, INC.
Industrial Aromatics Division
330 West 42nd St., New York, N. Y.

COMPOUNDING Materials
Vulcanizing Agents — Pigments
Accelerators — Clays
Antioxidants — Mineral Rubber
Plasticizers — Aromatics
Dispersions — Blacks
R. T. VANDERBILT CO.
230 Park Ave. New York City

IRON OXIDES
Asbestine—Barytes—Talc—
Soapstone
C. K. Williams & Co.
EASTON, PA.

PARA-FLUX
The Universal Softener—Adaptable, Uniform. Improves Quality—Economical.
The C. P. Hall Co.
2510 First Central Tower
Akron Ohio

CUMAR —Paracoumarone Resin.
A neutral gum for rubber compounding.
Samples and prices on request.
The Barrett Div.
Allied Chemical & Dye Corp.
40 Rector St. New York City

LAMP BLACKS
Produced according to the rigid specifications of the makers of EAGLE and OLD STANDARD Germantown Brands.
THE L. MARTIN COMPANY, Inc.
Unit of Columbian Carbon Co.
BINNEY & SMITH CO.
Distributor of Rubber Blacks
41 East 42nd Street New York, N. Y.

PELLETEX (The pellet *Gastex*)
The special process reinforcing black in free-flowing form. Saves power; none wasted; protects adjacent colored stocks.
Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
General Atlas Carbon Div.,
General Properties Co., Inc., Pampa, Texas

DU PONT Rubber Chemicals
DU PONT RUBBER COLORS
DU PONT ACCELERATORS
DU PONT ANTI-OXIDANTS
E. I. du Pont de Nemours & Co., Inc.
RUBBER CHEMICALS DIVISION
WILMINGTON, DELAWARE

MAGNESIUM OXIDE
Calcined Magnesium Oxide prepared for use in the compounding of neoprene. Full details on request.
J. T. Baker Chemical Co.
Phillipsburg New Jersey

RUBBER PROCESSING OILS
For outstanding compatibility in processing natural or modern synthetic rubbers, use
SUN RUBBER PROCESSING OILS
Write
SUN OIL COMPANY
Philadelphia Pennsylvania

EXTENDER
NAFTOLEN R 100 — Extender for Crude Rubber, Reclaim, Synthetics.
Wilmington Chemical Corporation
10 E. 40th St., New York, N. Y.

MAPICO COLORS
Pure Oxides of Iron
Yellows—Reds—Browns—Black
MAGNETIC PIGMENT CO.
Manufacturers
BINNEY & SMITH CO.
Distributors
41 East 42nd Street, New York, N. Y.

RUBBER SUBSTITUTES
White, brown and black.
The Carter Bell Mfg. Co.
Springfield, New Jersey

"FACTICE"—Prevents blooming, makes colors fast and a smoother batch.
(Reg. U. S. Pat. Off.)
Stamford Rubber Supply Co.
Stamford, Conn.

MOLD LUBRICANT
"Orvus" enables articles to leave molds readily; molds clean easily. Effective in hardest water. Also acts as thorough cleanser for molded and extruded rubber goods.
PROCTER & GAMBLE
Cincinnati Ohio

SOFTENERS
Rosin Oil — Pine Tar
Burgundy Pitch
"Galex" — a non-oxidizing Resin
National Rosin Oil & Size Co.
RKO Bldg. New York, N. Y.

FURNEX—FURNEX BEADS
The High Resilience
Semi-Reinforcing Black
BINNEY & SMITH CO.
41 East 42nd St. New York City

OROPLAST
Plasticizer—Sulphur Reactive
High Loading Tolerated
Great Elongation Produced
Cool Processing Stocks
Advance Solvents & Chem. Corp.
245 Fifth Ave., New York 16, N. Y.

SOLVENTS
"Skellysolve"—A superior solvent in six different types for various uses—for making rubber cements—for many different rubber fabricating operations.
SKELLY OIL CO., SOLVENTS DIV.
Skelly Bldg., Kansas City, Mo.

The Market Place

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Chemicals and Compounding Materials {continued}

STEARIC ACID
STEAREX . . . CAKE or POWDER
STEAREX BEADS
Standardized Products for Rubber Compounding
MINERAL RUBBER (Parmr), TALC
SOAPSTONE
BINNEY & SMITH CO.
41 East 42nd St. New York City

WAXES
Johnson's lustrous wax finishes retard oxidation, reduce friction, surface wear, tackiness.
S. C. JOHNSON & SON, INC.
Racine Wisc.

ZINC OXIDE PIGMENTS
The XX Reds Kadox
ZINC SULPHIDE PIGMENTS
The Cryptones The Albaliths (Lithopones)
The New Jersey Zinc Sales Co.
New York *Chicago*
Cleveland, Boston, San Francisco

SULPHURS
Rubbermakers' TIRE BRAND and TUBE BRAND. Also CRYSTEX Insoluble Sulphur, Sulphur Chloride, Caustic Soda, Carbon Bi-Sulphide, Carbon Tetra-Chloride.
Stauffer Chemical Company
2710 Graybar Bldg., New York City

ZINC OXIDES
AZO ZZZ Zinc Oxides
lead free—pure—uniform—dependable
AZO ZZZ-11 AZO ZZZ-55
AZO ZZZ-22 AZO ZZZ-44 AZO ZZZ-66
American Zinc Sales Company
Columbus, Ohio *New York*
Chicago *St. Louis*

ZINC OXIDES
Black Label Red Label Green Label
Manufactured by Our New Electrothermic Process
St. Joseph Lead Co.
250 Park Ave., New York
Plant and Laboratory: Monaca (Josephtown), Pa.

TITANIUM PIGMENTS
TITANOX
Unsurpassed in
OPACITY, WHITENESS, BRIGHTNESS
Titanium Pigment Corp., Sole Sales Agent, 111 Broadway, New York, N.Y.
104 South Michigan Ave., Chicago
350 Townsend Street, San Francisco
2472 Enterprise Street, Los Angeles

The Progressive Concern Selling to Rubber Manufacturers Uses THE MARKET PLACE for Results

ZINC STEARATE
ZINC LAURATE
Colite Mold Lubricant for Extra High Gloss
THE BEACON COMPANY
87 Bickford St., Boston, Mass.

Machinery and Equipment

BANBURYS REPAIRED
Re-building and re-surfacing rotors and mixing chambers has been our specialty for years.
INTERSTATE WELDING SERVICE
914 Miami St. Akron, Ohio

CUTTING MACHINERY
Specialists in Rubber Cutting Equipment for Bands, Crude Stock, Jar Rings, Tubes, Rollers, Washers, Treads, Cement Stock, etc.
See Black Rock for All Cutting Problems
Black Rock Manufacturing Co.
179 Osborne St. Bridgeport, Conn.

FORMS - PORCELAIN
Exclusive Manufacturers of Vitreous Porcelain Closed End Forms
No matter what shape or design—we can make it. Send blue print or sketch for our prices.
The Colonial Insulator Co.
936 Grant St. Akron, Ohio

CALENDER SHELLS
Gammeter's
ALL STEEL Calender Shells.
All welded. Any size.
New and better.
The W. F. GAMMETER CO.
Cadiz Ohio

DIAL GAUGES—Thickness
For measuring the thickness of rubber and similar materials. Many models.
Frank E. Randall
248 Ash St.,
Waltham Mass.

GRINDING MILLS
SPAN grinding mill reduces soft and hard rubber to fine powder.
Made in U. S. A.
M. Pancorbo
155 John St. New York, N. Y.

CUTTING DIES
Cutting and perforating dies of all types for rubber manufacturers.
Send for our quotations
Brockton Cutting Die & Machine Co.
Avon, Mass.

DRYING MACHINERY
For Synthetic Rubber, Reclaimed Rubber, Latex Processed Materials, etc.
PROCTOR & SCHWARTZ, INC.
Seventh St. & Tabor Rd. Philadelphia, Pa.

MACHINERY—RUBBER
"Master" Tube Molds, Tire Vulcanizers, Molds and Cores, Tire Drums, Tubers, etc.
Special Machinery Built to Order
Akron Standard Mold Co.
Akron, Ohio

CUTTING DIES
Also Tools, Dies, Jigs, Fixtures. Machine Parts and Special Machinery. Now engaged in Prime and Subcontract Work, Defense and Civilian.
Independent Die & Supply Co.,
LaSalle & Ohio Sts. St. Louis 4, Mo.

EXTRUDERS
The pioneer line of tubers, strainers and wire insulating machines. For latest developments inquire of
JOHN ROYLE & SONS
Paterson New Jersey

MACHINERY
L. ALBERT & SON
Trenton, N. J. Stoughton, Mass.
Los Angeles, Calif. Akron, O.

The Market Place

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Machinery and Equipment [continued]

MACHINERY
A complete service from the design of machinery to finished products of all kinds. Equipment for Plantations — also Reclaim, Latex and Rubber Plants.
Layouts — Formulas — Processes
Continental Machinery Company
305 BROADWAY, NEW YORK, N. Y.

MANDRELS—All Types
Circular and Straight—Aluminum and Steel
Licensed Under Clyde E. Lowe Co. Patents
Sherardizing and Chrome Plating
Machinery—Air Bag & Mandrel Polishing
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

SPECIAL MACHINERY
For Quality and Efficiency in Working Rubber. Consult us about your problems.
Utility Manufacturing Co.
Cudahy. Wisconsin

MACHINERY
A Comprehensive Line of Rubber and Plastic Equipment Including Tubers and Extruders, Tire Builders and Vulcanizers, Spreaders, Mixers, etc.
National Rubber Machinery Co.
Akron, Ohio

MOLDS
For tires, rubber specialties and mechanical goods; general machine work.
The Akron Equipment Co.
Akron, Ohio

STOCK SHELLS
A Type for Every Need—Large Diameter—Light Weight — Extra Strong — Seamless.
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

MACHINERY
Cutting, Trimming, Skiving
Cementing, Eyeletting.
Cutting Dies—Eyelets.
United Shoe Machinery Corp
140 Federal St. Boston, Mass

Processing Equipment
For Reclaiming Rubber
Attrition Mills; Conveyors; Crushers; Cutters; Elevators; "Frigidisc" Grinders; Hammer Mills; Mixers, Sifters, etc.
MERCER-ROBINSON CO., INC.
30 Church St., New York, N. Y.

TESTING MACHINES
RUBBER TENSILE TEST MACHINES
TEXTILE TESTING MACHINES
Write for Descriptive Literature
Henry L. Scott Co.
P. O. Box 963 Providence, R. I.

MAGNETIC EQUIPMENT of All Kinds
Separators Drums
Clutches Brakes
Rolls Special Magnets
Stearns Magnetic Mfg. Co.
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RUBBER STRIP CUTTER
Strips slab rubber up to 1" thick, 20,000 feet in 8 hours. Any width. Tolerance 1/64 to 1/100 inch. No rejects. Write for full details.
Simplex Cloth Cutting Mach. Co.
270 W. 39th St., New York, N. Y.

USED MACHINERY
For Rubber & Allied Industries
Mills, Calenders, Hydraulic Presses, Tubers, Vulcanizers, Mixers, etc.
Eric Bonwitt
87 So. High St., Akron, Ohio

Rubber—Crude; Scrap; Latex; Dispersions

CRUDE RUBBER
BALATA—SYNTHETIC CHICLE
We handle Manufacturers' Crude Rubber and Balata Purchase Permits.
Charles F. Connor & Co., Inc.
110 State St. Boston, Mass.
Telephone: LAFayette 1202

DISPERSITE
Water Dispersed Rubber
(Reclaimed—Crude—Synthetics)
Man-made Alternate for Latex
Dispersions Process, Inc.
1230 Sixth Ave., New York, N. Y.
Branch Office in Detroit

LOTOL
(Compounded Latex)
Ready to use
NAUGATUCK CHEMICAL
Division of United States Rubber Co.
Rockefeller Center, New York, N. Y.
Branch Office in Detroit

CRUDE RUBBER
SCRAP RUBBER
Also HARD RUBBER DUST
H. Muehlstein & Co., Inc.,
122 E. 42nd St., New York City
BRANCHES: Akron, Chicago, Boston, Los Angeles, Memphis, London.

GUAYULE RUBBER
AMPAR BRAND
Washed and Dried
Continental-Mexican Rubber Co.
Incorporated
745 Fifth Avenue, New York City
Formerly Distributed By
Continental Rubber Co., of N. Y.

REVERTEX
Highly Concentrated (About 75%)
Rubber Latex
Sole Distributor for U. S. A. and Canada
Revertex Corp. of America
37-08 Northern Blv'd., L. I. City, N. Y.

CRUDE RUBBER
SCRAP RUBBER
HARD RUBBER DUST
BALATA — GUTTA PERCHA
Hermann Weber & Company
76 Beaver St. New York

LATEX
Normal, Concentrated, Processed
HEVEATEX CORPORATION
78 Goodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

RUBBER
Crude Rubber
Liquid Latex
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

The Market Place

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Rubber [Cont'd]

RUBBER and PLASTICS SCRAP

ROTEX RUBBER CO., INC.
437 Riverside Ave., Newark, N. J.

RUBBER—Scrap and Crude
Also HARD RUBBER DUST
A. SCHULMAN, INC.
790 E. Tallmadge Ave., Akron, Ohio
14th & Converse Sts., E. St. Louis, Ill.
738 Statler Bldg., Boston, Mass.
500 Fifth Ave., New York, N. Y.
Warehouses at Akron, E. St. Louis and Boston

VULTEX— THE ONLY VULCANIZED LATEX
Insures Highest Quality, Uniformity, Economy, Simplicity of Application.
FULLY PROTECTED BY PATENTS
Also Latex and Latex Compounds
General Latex & Chemical Corp.
Successors to the Vultex Chemical Company
666 Main St. Cambridge, Mass.

Reclaimed Rubber . . . .

NERVASTRAL RECLAIMING PROCESSES
HIGH GRADE — HIGH SPEED
HIGH ECONOMY
Rubber & Plastics Compounds Co., Inc.
30 Rockefeller Plaza, New York, N. Y.
Tel: COlumbus 5-0085

RECLAIMED RUBBER—
For All Purposes
NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 Sixth Ave., N. Y. City

RECLAIMED RUBBER—
Uniformity, reliability, cleanliness
PEQUANOC RUBBER CO.
Butler, N. J.

RECLAIMED RUBBER—
A standardized grade for every requirement.
U. S. Rubber Reclaiming Co., Inc.
500 Fifth Ave., New York, N. Y.
"60 Years Serving the Industry Solely as Reclaimers"

Rubber—Synthetic

HYCAR
For extreme resistance to heat, abrasion, oil, gasoline, aging, and deterioration.
HYCAR CHEMICAL COMPANY
335 South Main St.
Akron Ohio

NEOPRENE
In different types to meet stringent requirements.
The Neoprene Notebook carries up-to-date information on neoprene. Ask for it.
E. I. du Pont de Nemours & Co., Inc.
Rubber Chemicals Div.
Wilmington Del.

PERBUNAN
Oil Resistance—Heat Resistance
Long Life
Full information upon request.
STANCO DISTRIBUTORS, INC.
26 Broadway New York, N. Y.

THIOKOL
Synthetic rubber available in several types, including powder form. Excellent heat and solvent resistance.
THIOKOL CORPORATION
Trenton N. J.

Consultants

CHEMISTS-ENGINEERS
Our staff of chemists, engineers and bacteriologists, with laboratories for analysis, research, physical testing and bacteriology are prepared to render you
Every Form of Chemical Service
FOSTER D. SNELL, INC.
312 Washington Street, Brooklyn 1, N. Y.

CONSULTING
LATEX TECHNOLOGIST
R. J. Noble, Ph.D.
21 Woodland Road, Malden, Mass.

CONSULTING
Rubber Technologist
Natural and Synthetic Rubber
R. R. Olin Laboratories
P. O BOX 372 AKRON OHIO
Telephones: HE 3724, FR 2561

Fabrics—Liners, Hollands

CUSTOM FINISHERS of
RUBBER REPELLENT LINERS
Capitol Process Liner Treatment
Textile Proofers, Inc.
181-183 Culver Avenue
Jersey City, N. J.

PROCESSED LINERS
"CLIMCO"—Fabrics treated to prevent adhesion of rubber stocks.
"LINERETTE"—Treated paper for separating or interleaving light weight rubber stocks.
The Cleveland Liner & Mfg. Co.
5508 Maurice Ave., Cleveland, Ohio

SEPARATOR CLOTHS
"BRATEX" Rubber Holland and special Starch Filled Glazed Sheetings for Waterproof Separator Cloths; Also Coated and Impregnated Fabrics.
The Holliston Mills, Inc.
Norwood, Mass.

Rubber Mnfrs.

MECHANICAL MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
Your Inquiries Solicited
Barr Rubber Products Co.
Sandusky, Ohio

SANITARY GOODS—
Dress Shields, Baby Pants, Aprons, Elastic Belts, Bloomers, Stepins, Bibs, Guimps and Brassieres.
SPECIAL GOODS CUT TO ORDER
Rand Rubber Co., Inc.
Sumner Ave. & Halsey St., Brooklyn, N. Y.

Miscellaneous

Use the
MARKET PLACE
Section

To Display
Your Products
It Brings Results!

WANT ADS

RATES: Five cents per word, minimum charge $2.00, except POSITIONS WANTED, $1.00 for 40 words or less, extra three cents per word. All classified advertisements payable in advance. Address replies to box numbers care of RUBBER AGE, 250 West 57th St., New York 19, N. Y.

POSITIONS WANTED

RUBBER SALESMAN now employed in Oklahoma selling Belting, Packing and Hose desires connection with factory as General Salesman for State of Oklahoma or would open up Southwest area and employ other salesman as Branch Manager. Good sales record; references; 47 years of age. Address Box 1402, RUBBER AGE.

CHEMIST AND FACTORY MANAGER, age 60, single, good health, temperate, reliable; some training chemistry M.I.T., experienced general analysis, and research many lines; prefer rubber analysis, compounding, manufacturing, reclaiming natural and synthetic. Competent manage small factory or department; go anywhere, fluent Spanish, now employed, but available. Address Box 1405, RUBBER AGE.

TECHNICAL, PLANT OR PRODUCTION MANAGEMENT in medium sized general line rubber or wire company is desired by chemical engineer with ten years diversified experience in rubber, extruded plastics and wire. Experience covers laboratory, mechanical goods sales, product-process development and engineering, supervision, technical management of defense project. Excellent health and record, age 33, parent. Will consider position in technical service or one leading directly to those listed above. North eastern or West Coast location preferred. Salary $6,500 minimum. All replies promptly answered. Address Box 1406, RUBBER AGE.

HELP WANTED

ELECTRICAL ENGINEER familiar with rubber factory electrical equipment. Good opportunity in medium sized plant located in Pennsylvania. Address Box 1386, RUBBER AGE.

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